NOTHOFAGUS CUNNINGHAMII (SOUTHERN BEECH) VEGETATION IN AUSTRALIA

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NOTHOFAGUS CUNNINGHAMII (SOUTHERN BEECH) VEGETATION IN AUSTRALIA

John R. Busby

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Bureau of Flora and Fauna
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Cover photograph:
Nothofagus cunninghamii vegetation on Mt Donna Buang, Victoria. Inset: new (yellow) and old (green) leaves of *N. cunninghamii*, Tasmania. [C.H. Busby].

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Preface

The Flora and Fauna Series comprises occasional publications designed to make available, as widely as possible, the results of biogeographical activities and projects undertaken by, or on behalf of, the Bureau of Flora and Fauna.

This first number deals with vegetation dominated by *Nothofagus cunninghamii* in southeastern Australia. The work describes data collected by the author, and other scientists, on the plant species composition of the coolest and wettest forest vegetation in Tasmania and Victoria.

Bureau of Flora and Fauna
May 1984

Nothofagus cunninghamii (Southern Beech) Vegetation in Southeastern Australia

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John R. Busby

Abstract

A classification of the floristic composition of 304 sites containing *Nothofagus cunninghamii* in Tasmania and Victoria has revealed two major vegetation types, each with a number of subordinate units. The *Tasmannia—Astelia* Order is confined to high altitudes in southwestern Tasmania and contains four Associations, one with two Sub-associations. The *Atherosperma—Blechnum* Order is found at lower elevations in Tasmania and at both high and low elevations in Victoria, and contains two Alliances (one confined to Tasmania), each with a number of constituent Associations, Sub-associations and Variants. Each vegetation type is described in terms of characteristic species and geographic and altitudinal range. Floristic relationships between different vegetation types are not necessarily reflected in vegetation structure, hence structural classifications may be inappropriate for investigations of environmental factors that control the distribution of plant taxa.

Introduction

The genus *Nothofagus* has substantial biogeographical significance (e.g. van Steenis 1972); its distribution in regions which once formed part of the ancient supercontinent Gondwanaland, and its ancient history, illustrated by an excellent fossil record extending back to the Cretaceous (Dettmann 1981), have stimulated research into the vegetation history and palaeoclimates of Australia and other southern lands. Considerable problems remain, however, in elucidating the centre of origin, dispersal routes and evolution within *Nothofagus* (Hill 1983).

Study of extant populations of *Nothofagus*, and the species with which they are now associated, should assist interpretation of species assemblages in the fossil record. This paper reports the results of a study of one species in the genus across its present geographical range in southeastern Australia.

Nothofagus cunninghamii (Hook.) Oerst.[1] is confined mainly to the western half and northeastern corner of Tasmania and to several isolated regions in south-central Victoria (Howard and Ashton 1973). It is found at elevations from sea level to over 1200 metres in Tasmania and from over 200 to ca. 1500 m in Victoria, with one small isolated population near sea level on Wilsons Promontory.

It is generally confined to environments where the mean annual temperature ranges from 5 to 14°C, with a monthly mean maximum in summer below 27°C and a monthly mean minimum in winter above –3°C. Mean annual precipitation ranges from 1000 to over 3500 mm, with a winter maximum, and at least 160 mm falling in the driest quarter of the year (Busby, unpublished).

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[1] *Unless otherwise indicated (see Table 2), nomenclature follows Willis (1970, 1972) or, for species not present in Victoria, Curtis (1963, 1967, 1979) and Curtis and Morris (1975).*

Inventories of structural vegetation types in which *N. cunninghamii* occurs can be found in Specht *et al.* (1974). The species is associated with rainforest and other mesic vegetation in a wide variety of structural types in Tasmania, i.e. the canopy of tall closed-forest (Specht *et al.*, 1974, p. 323; subsequent page numbers refer also to this source), closed-forest (p. 324) and low closed-forest (p. 327); as a (presumed) component of the rainforest understorey in tall open-forest (e.g. p. 346), open-forest (e.g. p. 361), low open-forest (e.g. p. 362), tall woodland (e.g. p. 372), woodland (e.g. p. 361), tall open-woodland (e.g. p. 351) and open-woodland (e.g. p. 361); and canopy of closed-scrub (p. 330) and closed heath (p. 363). In Victoria it is similarly found in the canopy of tall closed-forest (p. 454), as an understorey in tall open-forest, and in the canopy of closed-forest (p. 455) and low closed-forest (p. 457).

Vegetation analyses based on structural attributes provide very little information on the species composition of the derived units. Species composition of the vegetation may bear little relationship to structural types (c.f. Bridgewater 1978). In this case it is apparent from the above structural analysis that vegetation associated with *Nothofagus cunninghamii* in Victoria is broadly similar to that in Tasmania, albeit somewhat less diverse, but it is not possible to determine whether the floristic communities show a similar pattern. There have been no comprehensive studies of the vegetation associated with this species across its entire distributional range, with the exception of a preliminary study reported by Busby (1973) and Busby and Bridgewater (1977). Some recent floristic studies in significant parts of its Tasmanian range have been reported by Jarman and Brown (1982) and Brown (1983), while comparable studies of Victorian vegetation have been reported by Howard (1970) and Howard and Ashton (1973).

The purposes of this study were to identify and describe floristic vegetation types associated with *Nothofagus cunninghamii* in Tasmania and Victoria, to outline the geographical distributions of these vegetation types and the differences between Tasmania and Victoria, and to briefly compare the major floristic types detected with the structural formation types used by Specht *et al.* (1974).

Methods

Site Selection

Sample sites were located in as wide a variety of geographical and topographical locations as access and resources allowed. A total of 90 sites were sampled in Tasmania and 59 in Victoria. Additional data from 85 sites in Tasmania were obtained from M.J. Brown (pers. comm.), Kirkpatrick (1980 and in press), Kirkpatrick and Harwood (1980), and Pedley *et al.* (1980); and from 70 sites in Victoria from P.K. Gullan (pers. comm.). The locations of the sites are shown in Figure 1.

Samples were chosen from vegetation which appeared to be minimally disturbed, i.e. no signs of recent fire, logging or obvious disturbance of the tree canopy, and with few weeds. Each sample was at least 100m^2.

Data Collection

Presence data, in most cases with cover/abundance values (Braun-Blanquet 1964), were collected for all vascular plants, with the exception of filmy ferns in the family Hymenophyllaceae. One exception was the data from Pedley *et al.* (1980), which considered only the most prominent species.

Data Classification

The data were coded for computer analysis and all species which occurred fewer than three times in the 304 sites eliminated. The data were analysed using the CSIRONET 'TAXON' (Version P3) programs 'DMINF' and 'MACINF' (Ross, 1982) and manually sorted using the Zürich-Montpellier approach.

DMINF is a divisive monothetic information analysis based on Lance and Williams (1968). The algorithm seeks the group with the largest internal heterogeneity and divides it into two subgroups on the presence or absence of that attribute which gives rise to the greatest information fall between the parent group and the subgroups.

MACINF is a polythetic agglomerative analysis based on Lance and Williams (1967). The algorithm uses the Shannon-type information statistic to calculate a decision-function which determines which individuals (or groups) are next to be fused.

The Zürich-Montpellier approach involves visual re-ordering of a table of sites and species so that species occurrences are maximally concentrated into site-species groups (c.f. Bridgewater 1971). It is equivalent to a polythetic divisive analysis combined with a unidimensional ordination. A species allocated to a site-species group must occur in at least 50 per cent of the sites in that group. Similarly, a site allocated to a site-species group must contain at least 50 per cent of the species in that group.

Comparison of Classifications

The three classifications provided slightly different interpretations of the data. In order to determine which classification would be used for the subsequent interpretation, two independent, objective methods of determining the 'best' of a number of alternative classifications of the same data were devised.

The first method assessed the relative degree of concentration of the data into site-species groups. In an ideal classification the majority of species would be either close to 100 per cent present or 100 per cent absent in any particular site group, with very few species in the region of 50 per cent. The procedure adopted was to allocate all species occurrences in site groups to five constancy classes, each 20 per cent wide, ranging from I (species present in > 0–20 per cent of sites), through II, III and IV to V (> 80–100 per cent). No account was taken of species absences from site groups. Only those species with at least one value of III or greater (> 40 per cent presence) in at least one site group were considered further. The numbers of records in each constancy class for these species, for all site groups, were accumulated in a frequency distribution, and the percentage contribution to the total by each of the five constancy classes calculated. (The totals for classes I and II would be biased downwards by the deletion of uncommon species). The best classification was where the contribution of the > 40–60 per cent group (class III) was lowest and those of the > 0–20 per cent and > 80–100 per cent groups (classes I and V) the highest.

The second method assessed the extent to which sites were more similar to the site groups to which they had been allocated by the classification than to any other site group. In an ideal classification all sites should have higher similarity to their site group than to all others. The procedure generated a group species list, comprising all species with > 40 per cent occurrence in that group, for each site group. Then, using all species present in the site, Jaccard similarity coefficients (Jaccard 1912) were calculated between that site and each group species list. The Jaccard coefficient was adopted following the recommendation of Faith (1983). The percentage of sites with higher similarities to groups other than their own was calculated. The best classification was the one with the lowest percentage of 'misallocations'.

Results

Comparison of Classifications

The results of the analysis of the degree of data concentration in site-species groups are presented in Table 1. A chi-square test of homogeneity showed a significant deviation from homogeneity ($p<0.005$), with the greatest contribution coming from a very low value in constancy class III for the Zürich-Montpellier classification. The low percentage of records in this class for the Zürich-Montpellier classification, and higher percentages in classes I and V than in the other classifications imply that, according to the criterion outlined above, it is the best of the three.

		CONSTANCY CLASS					TOTAL
		I	II	III	IV	V	N
RANGE (%)		(1–20)	(21–40)	(41–60)	(61–80)	(81–100)	
CLASSIFICATION							
Monothetic Divisive	(n)	374	187	149	69	100	879
	(%)	43	21	17	8	11	100
Polythetic Agglomerative	(n)	363	205	167	98	108	941
	(%)	39	22	18	10	11	100
Zürich-Montpellier	(n)	401	175	105	90	123	894
	(%)	45	19	12	10	14	100

Table 1.
Species occurrence in constancy classes in the classifications.

The results of the analysis of the degree of site similarity to site groups showed that the Monothetic Divisive classification had 33 per cent of sites more similar to groups other than the one to which they had been allocated, with the Polythetic Agglomerative and Zürich-Montpellier classifications having 16 per cent and 14 per cent respectively. By the criterion outlined above, the Zürich-Montpellier classification was again the best, and is therefore used in all subsequent interpretations.

Vegetation Classification

The classification delimited 20 floristic groups, comprising 277 of the 304 sites (Fig. 2). The remaining 27 sites (see Appendix) could not be classified, either because they represented unique assemblages, examples of different vegetation types which were inadequately sampled (a minimum of five sites was considered necessary for each recognised type), or types related to existing units but which lacked sufficient of the characteristic species. In the last case it is possible that further searching at the site would locate these missing species.

The classification shown in Fig. 2 was interpreted as a hierarchy, from broad-scale vegetation units or 'Orders', through 'Alliances', 'Associations' and 'Sub-associations' to narrowly-defined units or 'Variants', following the conventions of the Zürich-Montpellier system (Bridgewater 1971). All vegetation units have an identifier which reflects their position in the hierarchy and a name reflecting one or two characteristic taxa. The identifier may consist of up to five numbers, viz. Order.Alliance.Association. Sub-association.Variant, for example 1.2.3 would be Association 3 of Alliance 2 of Order 1. A value of zero in the numbering system indicates that the group at this level has no characteristic species additional to those of the level above it. In the case of

Sub-associations the group is labelled as the *typicum* (i.e. typical, with no additional characteristic species) of the Association. The term 'characteristic species' refers to species occurring in more than 60 per cent of the sites in the group. The species compositions of the various groups are shown in the Tables indicated. Table 2 is a Constancy Table of the species composition of each of the 20 floristic groups identified in the analysis. This Table shows the proportion of sites in each group containing each species, on the five-point scale from I to V, as outlined. Table 3 is a Constancy Table of the species composition of each Association and higher level groups, showing the floristic relationships between them. Tables 4–12 are Species by Site tables for individual Associations. Descriptions of all identified vegetation groups follow (mean elevations are shown only for lowest level groups).

1: *Atherosperma—Blechnum* ORDER

Number of sites:	236.
Characteristic species:	*Atherosperma moschatum*, *Blechnum wattsii*, *Grammitis billardieri.*
Floristic groups:	1–15 (Table 2).
Association groups:	1–5 (Table 3).
Floristic composition:	Tables 4–8.
Geographic range:	Western and northeastern Tasmania; south-central Victoria (Figs 3–7).

1.1: *Dicksonia—Polystichum* ALLIANCE

Number of sites:	165.
Characteristic species:	*Dicksonia antarctica*, *Polystichum proliferum.*
Floristic groups:	1–11 (Table 2).
Association groups:	1–3 (Table 3).
Floristic composition:	Tables 4–6.
Geographic range:	Western and northeastern Tasmania; south-central Victoria (Figs 3–5).

1.1.0: *Dicksonia—Polystichum* ASSOCIATION

Number of sites:	50.
Characteristic species:	*Microsorium diversifolium.*
Floristic groups:	9–11 (Table 2).
Association group:	3 (Table 3).
Floristic composition:	Table 6.
Geographic range:	Northern, northwestern and southeastern Tasmania; south-central Victoria (Fig. 5).

1.1.0.0: *typicum* of ASSOCIATION

Number of sites:	25.
Characteristic species:	none.
Floristic group:	10 (Table 2).
Floristic composition:	Table 6.
Geographic range:	Northern, northwestern and southeastern Tasmania (elev. 10–800 m); Central Highlands (680–1160 m) and West Gippsland (600 m) in Victoria ('2' in Fig. 5).
Elevation (mean±s.e.):	619±58 m.

1.1.0.1: *Pomaderris apetala* SUB-ASSOCIATION

Number of sites: 9.
Characteristic species: *Acacia dealbata*, *Microsorium diversifolium*, *Olearia argophylla*, *Pittosporum bicolor*, *Pomaderris apetala.*
Floristic group: 9 (Table 2).
Floristic composition: Table 6.
Geographic range: Northern (elev. 80–840 m) and southeastern (1 site, 440 m) Tasmania ('1' in Fig. 5).
Elevation (mean±s.e.): 489±78 m.

1.1.0.2: *Rumohra adiantiformis* SUB-ASSOCIATION

Number of sites: 16.
Characteristic species: *Microsorium diversifolium*, *Rumohra adiantiformis.*
Floristic group: 11 (Table 2).
Floristic composition: Table 6.
Geographic range: Northern and northwestern Tasmania (elev. 40–590 m); Central Highlands (1 site, 310 m) and West Gippsland (2 sites, 440 m) in Victoria ('3' in Fig. 5).
Elevation (mean±s.e.): 344±53 m.

1.1.1: *Poa—Acaena* ASSOCIATION

Number of sites: 25.
Characteristic species: *Acaena novae-zelandiae*, *Olearia phlogopappa*, *Poa australis.*
Floristic groups: 1–2 (Table 2).
Association group: 1 (Table 3).
Floristic composition: Table 4.
Geographic range: Northeast Tasmania; highlands of south-central Victoria (Fig. 3).

1.1.1.1: *Wittsteinia vacciniacea* SUB-ASSOCIATION

Number of sites: 11.
Characteristic species: *Carex appressa*, *Coprosma nitida*, *Dianella tasmanica*, *Geranium potentilloides*, *Leptospermum grandifolium*, *Tasmannia xerophila*, *Wittsteinia vacciniacea.*
Floristic group: 1 (Table 2).
Floristic composition: Table 4.
Geographic range: Lake Mountain and Mt Baw Baw (900–1440 m) in Central Highlands of Victoria ('1' in Fig. 3).
Elevation (mean±s.e.): 1214±56 m.

1.1.1.2: *Eucalyptus delegatensis* SUB-ASSOCIATION

Number of sites: 14.
Characteristic species: *Australina muelleri*, *Eucalyptus delegatensis*, *Olearia phlogopappa.*
Floristic group: 2 (Table 2).
Floristic composition: Table 4.
Geographic range: Mt Barrow (1 site, 1040 m) in northeastern Tasmania; Central Highlands (930–1240 m) in Victoria ('2' in Fig. 3).
Elevation (mean±s.e.): 1072±28 m.

1.1.2: *Eucalyptus—Clematis* ASSOCIATION

Number of sites: 90.
Characteristic species: *Acacia dealbata*, *Australina muelleri*, *Clematis aristata*, *Eucalyptus regnans*, *Hedycarya angustifolia.*
Floristic groups: 3–8 (Table 2).
Association group: 2 (Table 3).
Floristic composition: Table 5.
Geographic range: Northern and eastern Tasmania; south-central Victoria (Fig. 4).

1.1.2.1: *Histiopteris incisa* SUB-ASSOCIATION

Number of sites: 40.
Characteristic species: *Acacia dealbata*, *Histiopteris incisa*, *Olearia phlogopappa.*
Floristic groups: 3–5 (Table 2).
Floristic composition: Table 5.
Geographic range: Northern Tasmania; south-central Victoria ('1', '2' & '3' in Fig. 4).

1.1.2.1.0: *typicum* of SUB-ASSOCIATION

Number of sites: 13.
Characteristic species: none.
Floristic group: 4 (Table 2).
Floristic composition: Table 5.
Geographic range: North central Tasmania (1 site, 760 m); Central Highlands (540–1070 m) in Victoria ('2' in Fig. 4).
Elevation (mean±s.e.): 793±39 m.

1.1.2.1.1: *Stellaria flaccida* VARIANT

Number of sites: 10.
Characteristic species: *Cassinia aculeata*, *Dianella tasmanica*, *Dryopoa dives*, *Hydrocotyle hirta*, *Polyscias sambucifolia*, *Senecio linearifolius*, *Stellaria flaccida.*
Floristic group: 3 (Table 2).
Floristic composition: Table 5.
Geographic range: Central Highlands (720–1080 m) in south-central Victoria ('1' in Fig. 4).
Elevation (mean±s.e.): 962±35 m.

1.1.2.1.2: *Lomatia fraseri* VARIANT

Number of sites: 17.
Characteristic species: *Blechnum nudum*, *Carex appressa*, *Hydrocotyle hirta*, *Lomatia fraseri*, *Pittosporum bicolor*, *Polyscias sambucifolia*, *Viola hederacea.*
Floristic group: 5 (Table 2).
Floristic composition: Table 5.
Geographic range: Central Highlands (240–760 m) and West Gippsland (1 site, 450 m) in Victoria ('3' in Fig. 4).
Elevation (mean±s.e.): 723±46 m.

1.1.2.2: *Tetrarrhena juncea* SUB-ASSOCIATION

Number of sites: 13.
Characteristic species: *Acacia dealbata*, *Acacia melanoxylon*, *Cyathea australis*, *Parsonsia brownii*, *Polyscias sambucifolia*, *Tetrarrhena juncea*.
Floristic group: 6 (Table 2).
Floristic composition: Table 5.
Geographic range: Central Highlands (240–760 m) and West Gippsland (1 site, 450 m) in Victoria ('4' in Fig. 4).
Elevation (mean±s.e.): 479±45 m.

1.1.2.3: *Asplenium bulbiferum* SUB-ASSOCIATION

Number of sites: 37.
Characteristic species: *Asplenium bulbiferum*, *Blechnum chambersii*, *Microsorium diversifolium*, *Pittosporum bicolor*, *Rumohra adiantiformis*.
Floristic groups: 7–8 (Table 2).
Floristic composition: Table 5.
Geographic range: Eastern Tasmania; south-central Victoria ('5' & '6' in Fig. 4).

1.1.2.3.1: *Coprosma quadrifida* VARIANT

Number of sites: 18.
Characteristic species: *Coprosma quadrifida*, *Cyathea australis*, *Olearia argophylla*.
Floristic group: 7 (Table 2).
Floristic composition: Table 5.
Geographic range: Central Highlands (470–800 m), Otway Ranges (260–400 m), West Gippsland (240–480 m) and Wilsons Promontory (1 site, 35 m) in Victoria ('5' in Fig. 4).
Elevation (mean±s.e.): 434±41 m.

1.1.2.3.2: *Blechnum fluviatile* VARIANT

Number of sites: 19.
Characteristic species: *Blechnum fluviatile*.
Floristic group: 8 (Table 2).
Floristic composition: Table 5.
Geographic range: Eastern Tasmania (470–580 m); Central Highlands (540–850 m), Otway Ranges (250–500 m) and West Gippsland (440–610 m) in Victoria ('6' in Fig. 4).
Elevation (mean±s.e.): 598±41 m.

1.2: *Anodopetalum—Anopterus* ALLIANCE

Number of sites: 71.
Characteristic species: *Anodopetalum biglandulosum*, *Anopterus glandulosus*, *Eucryphia lucida*, *Phyllocladus aspleniifolius*.
Floristic groups: 12–15 (Table 2).
Association groups: 4–5 (Table 3).
Floristic composition: Tables 7–8.
Geographic range: Western, southwestern and southern Tasmania (Figs 6–7).

1.2.0: *Anodopetalum—Anopterus* ASSOCIATION

Number of sites: 48.
Characteristic species: none.
Floristic groups: 12–13 (Table 2).
Association group: 4 (Table 3).
Floristic composition: Table 7.
Geographic range: Western, southwestern and southern Tasmania (Fig. 6).

1.2.0.0: *typicum* of ASSOCIATION

Number of sites: 28.
Characteristic species: none.
Floristic group: 12 (Table 2).
Floristic composition: Table 7.
Geographic range: Western (30–380 m), southwestern (280–580 m) and southern (60–440 m) Tasmania ('1' in Fig. 6).
Elevation (mean±s.e.): 426±43 m.

1.2.0.1: *Trochocarpa gunnii* SUB-ASSOCIATION

Number of sites: 20.
Characteristic species: *Cenarrhenes nitida*, *Gahnia grandis*, *Trochocarpa gunnii.*
Floristic group: 13 (Table 2).
Floristic composition: Table 7.
Geographic range: Western (35–840 m) and southwestern (5–780 m) Tasmania ('2' in Fig. 6).
Elevation (mean±s.e.): 226±53 m.

1.2.1: *Richea—Archeria* ASSOCIATION

Number of sites: 23.
Characteristic species: *Agastachys odorata*, *Archeria eriocarpa*, *Athrotaxis selaginoides*, *Prionotes cerinthoides*, *Richea pandanifolia.*
Floristic groups: 14–15 (Table 2).
Association group: 5 (Table 3).
Floristic composition: Table 8.
Geographic range: Western and southern Tasmania (Fig. 7).

1.2.1.0: *typicum* of ASSOCIATION

Number of sites: 12.
Characteristic species: none.
Floristic group: 14 (Table 2).
Floristic composition: Table 8.
Geographic range: Western (490–700 m) and southwestern (1 site, 660 m) Tasmania ('1' in Fig. 7).
Elevation (mean±s.e.): 573±20 m.

1.2.1.1: *Agastachys odorata* SUB-ASSOCIATION

Number of sites: 11.
Characteristic species: *Agastachys odorata*, *Cenarrhenes nitida*, *Eucryphia milliganii.*
Floristic group: 15 (Table 2).
Floristic composition: Table 8.

Geographic range: Western (500–760 m) and southwestern (1 site, 710 m) Tasmania (‘2’ in Fig. 7).
Elevation (mean±s.e.): 680±26 m.

2: *Tasmannia—Astelia* ORDER

Number of sites: 41.
Characteristic species: *Athrotaxis selaginoides*, *Astelia alpina*, *Orites diversifolia*, *Richea scoparia*, *Tasmannia lanceolata.*
Floristic groups: 16–20 (Table 2).
Association groups: 6–9 (Table 3).
Floristic composition: Tables 9–12.
Geographic range: Western, south-central and southern Tasmania (Figs 8–11).

2.0: *Tasmannia—Astelia* ALLIANCE

Attributes as above.

2.0.0: *Tasmannia—Astelia* ASSOCIATION

Number of sites: 13.
Characteristic species: *Richea pandanifolia.*
Floristic group: 20 (Table 2).
Association group: 9 (Table 3).
Floristic composition: Table 12.
Geographic range: Western (900–1050 m), south-central (1 site, 1040 m) and southern (660–1120 m) Tasmania (Fig. 11).
Elevation (mean±s.e.): 908±39 m.

2.0.1: *Richea—Cyathodes* ASSOCIATION

Number of sites: 7.
Characteristic species: *Agastachys odorata*, *Cenarrhenes nitida*, *Cyathodes juniperina*, *Eucryphia milliganii*, *Monotoca submutica*, *Olearia persoonioides*, *Phyllocladus aspleniifolius*, *Prionotes cerinthoides*, *Richea milliganii.*
Floristic group: 16 (Table 2).
Association group: 6 (Table 3).
Floristic composition: Table 9.
Geographic range: Western (1 site, 850 m) and southern (670–920 m) Tasmania (Fig. 8).
Elevation (mean±s.e.): 803±37 m.

2.0.2: *Coprosma—Cyathodes* ASSOCIATION

Number of sites: 14.
Characteristic species: *Bauera rubioides*, *Coprosma nitida*, *Cyathodes parvifolia*, *Exocarpos humifusus*, *Telopea truncata.*
Floristic groups: 17–18 (Table 2).
Association group: 7 (Table 3).
Floristic composition: Table 10.
Geographic range: Western, south-central and southern Tasmania (Fig. 9).

2.0.2.1: *Eucalyptus vernicosa* SUB-ASSOCIATION

Number of sites: 6.
Characteristic species: *Epacris serpyllifolia*, *Eucalyptus vernicosa*, *Eucryphia milliganii*, *Exocarpos humifusus*, *Monotoca submutica*, *Prionotes cerinthoides.*
Floristic group: 17 (Table 2).
Floristic composition: Table 10.
Geographic range: Southern (830–960 m) Tasmania ('1' in Fig. 9).
Elevation (mean±s.e.): 913±23 m.

2.0.2.2: *Eucalyptus coccifera* SUB-ASSOCIATION

Number of sites: 8.
Characteristic species: *Eucalyptus coccifera*, *Gaultheria hispida*, *Richea sprengelioides*, *Telopea truncata.*
Floristic group: 18 (Table 2).
Floristic composition: Table 10.
Geographic range: Western (1 site, 1080 m), south-central (1000–1060 m) and southern (820–1120 m) Tasmania ('2' in Fig. 9).
Elevation (mean±s.e.): 1005±36 m.

2.0.3: *Pentachondra—Carpha* ASSOCIATION

Number of sites: 7.
Characteristic species: *Carpha alpina*, *Celmisia asteliifolia*, *Diplaspis cordifolia*, *Epacris serpyllifolia*, *Oreobolus acutifolius*, *Pentachondra pumila.*
Floristic group: 19 (Table 2).
Association group: 8 (Table 3).
Floristic composition: Table 11.
Geographic range: Western (1 site, 1040 m) and southern (940–1040 m) Tasmania (Fig. 10).
Elevation (mean±s.e.): 987±15 m.

Discussion

The major floristic variation within the vegetation associated with *Nothofagus cunninghamii* is between the *Tasmannia—Astelia* Order above 650 metres in the mountains of western and southwestern Tasmania and the *Atherosperma—Blechnum* Order elsewhere in Tasmania and in Victoria. The next major division in the latter group is between the *Anodopetalum—Anopterus* Alliance of western and southern Tasmania and the *Dicksonia—Polystichum* Alliance in western and northeastern Tasmania and in Victoria. These latter groups overlap geographically and altitudinally in western Tasmania. Thus all three major groups are represented in Tasmania, but only one in Victoria (c.f. Jarman and Brown, 1982). Within that group, however, several subgroups are completely or largely restricted to Victoria.

Sections of the floristic classification are in broad agreement with classifications derived by other workers in regional areas. For example the *Dicksonia—Polystichum* Alliance, *Anodopetalum—Anopterus* Association and *Richea—Archeria* Association correspond, respectively, to the 'Eastern Rainforest', 'Leatherwood Rainforest' and 'Scrub Rainforest' of Jarman and Brown (1982). The *Dicksonia—Polystichum* Alliance and *Anodopetalum—Anopterus* Alliance also correspond, respectively, to the 'Myrtle, Myrtle—Sassafras' and 'Myrtle—Leatherwood, Myrtle—Leatherwood—Horizontal' of

Brown (1983). The *Richea—Archeria* Association corresponds to the 'Low Mountain Forest' of Gibbs (1920). Other correspondences exist with individual communities described by Jarman and Crowden (1978, 1979), Jarman *et al.* (1982), Kirkpatrick (1977), Martin (1940), Moscal (1980, 1981), Parsons *et al.* (1977) and Sutton (1929). The strong correlation between floristic vegetation and altitude in Victoria within the *Atherosperma—Blechnum* Order was also noted by Howard (1970) and Howard and Ashton (1973).

Most of the species found to be associated with *Nothofagus cunninghamii* also occur in areas where this species is absent. Many of the communities detected in this analysis may also extend into these areas, but whether the species combinations retain their integrity or change, perhaps in response to the factors which control the distribution of *Nothofagus cunninghamii* itself, remains to be established.

One purpose of this investigation was to assess whether a classification based on structural features of the vegetation, i.e. Specht *et al.* (1974), could provide a useful framework for evaluating plant species and environmental interrelationships. It was found, however, that floristic variation is not reflected in structural features of the vegetation. For example, subalpine closed-forest in Tasmania is similar in structure to, but very different in floristic composition from, that in Victoria. The Tasmanian vegetation forms one major group, the *Tasmannia—Astelia* Order while the Victorian vegetation is only one component of the *Atherospermum—Blechnum* Order, and is thus more similar in floristic composition to vegetation of different structures occurring at lower elevations in Victoria and Tasmania than to that of similar structure occurring at high elevations in Tasmania.

Similarly the *Dicksonia—Polystichum* Alliance encompasses a wide variety of structural vegetation types from tall open-woodland to low closed-forest. The same structural types are found in the *Anodopetalum—Anopterus* Alliance, which has a significantly different floristic composition.

It is clear that, at least in these southern cool wet forests, structural classifications of the kind used by Specht *et al.* (1974) provide no reliable indicator of species composition, and are unlikely to lead to any environmental analysis which is relevant to individual plant species or groups of species. On the other hand, analyses of correlations between the floristic types described above and climatic parameters (details to be presented elsewhere) are highly suggestive of climatic control of plant species composition in this forest, even down to the finest level of detail detected in this analysis, i.e. the Variants. Analysis of the actual species composition would appear to be a necessary prerequisite to evaluation of factors likely to control plant distributions, and thus establishment of management programs.

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Table 2. Constancy table for floristic groups (I = species occurs in > 0–20% of sites, II = > 20–40%, III = > 40–60%, IV = > 60–80%, V = > 80–100%).

Floristic Group:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of sites:	11	14	10	13	17	13	18	19	9	25	16	28	20	12	11	7	6	8	7	13
SPECIES																				
Tasmannia xerophila (Parment.) M. Gray	IV																			
Wittsteinia vacciniacea	V	I								I										
Geranium potentilloides	IV	II	II	I	I													II		
Leptospermum grandifolium	V	II		I		I			II	I		I	I					II		
Dianella tasmanica	IV	III	IV	II	III	I			I											
Carex appressa	V	I	I	II	IV	I	III	III		I	I									
Eucalyptus delegatensis	I	IV	II	I	I				I	I			I							
Poa australis sp. agg.	V	IV	II	I	I					I							I	II	III	
Acaena novae-zelandiae Kirk	V	IV	I	II	III			I	I									II		I
Senecio linearifolius	II	II	IV	II	II			I												
Dryopoa dives		I	V		II		I													
Stellaria flaccida	I	II	V	I	III	I	I			I										
Cassinia aculeata	II	I	IV	I	III	I	I	I		I										
Hydrocotyle hirta	II	I	IV	II	IV	I	I	I		I	I									
Polyscias sambucifolia (DC.) Harms	II	II	V	II	IV	IV	I			I	I									
Viola hederacea	III	II	II	III	V	II	II	I										I		
Lomatia fraseri		I	III	I	IV	II	I	I		I										
Blechnum nudum		I		II	IV	III	I	I	II	I	I		I							
Olearia phlogopappa	III	V	V	V	V	I	I	I												
Histiopteris incisa		III	V	V	V	II	II	I	III	II	I	I								
Acacia dealbata	II	II	IV	IV	V	V	II	II	IV	I	I									
Tetrarrhena juncea			II	III	III	V	III	I		I										
Parsonsia brownii				I	II	IV	II	II		I	I									
Acacia melanoxylon		II		I	III	IV	III	I	II	I	I	I	I							
Cyathea australis			I	I	II	IV	IV	I		I										
Coprosma quadrifida				II	III	III	V	II	II	II	III	I	I							
Asplenium bulbiferum				I	II		V	V	II	I	II									
Blechnum chambersii Tindale					III	II	IV	IV	II		I									
Microsorium diversifolium			I	II	II	II	V	V	IV	III	V	II								
Rumohra adiantiformis				I	II	II	IV	IV	I	I	V	I								
Eucalyptus regnans	I	I	IV	IV	IV	IV	IV	III	II	II	I									
Australina muelleri		IV	IV	IV	V	IV	IV	IV		I	I									
Clematis aristata		I	IV	IV	V	IV	V	IV	I	I	I									
Hedycarya angustifolia			II	III	IV	IV	V	IV		I										
Pittosporum bicolor	I	I	I	II	V	II	IV	IV	V	II	II	II	I							
Olearia argophylla			III	II	I	II	V	I	IV	I	II									

Table 2 (cont.)

Floristic Group:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
SPECIES																				
Pomaderris apetala								I	V		I									
Dicksonia antarctica	II	V	V	V	V	V	V	V	V	V	V	I	I	I						
Polystichum proliferum	V	V	V	V	V	III	IV	IV	V	IV	V	II	I					II		
Gahnia grandis								I	I	I	I	II	IV	III	III	II	III	II	II	
Trochocarpa gunnii												I	IV	I		I	I	III	I	I
Cenarrhenes nitida										I		I	IV	I	IV	V	III			
Agastachys odorata													I	II	V	IV	II			
Eucryphia milliganii														I	V	V	V	II	II	II
Archeria eriocarpa												I	II	IV	V	II				II
Prionotes cerinthoides										I			I	V	V	IV	IV	I	I	III
Richea pandanifolia										I		I	I	V	V	III	II	II	II	V
Eucryphia lucida									I	I	II	V	V	V	I					
Phyllocladus aspleniifolius										I	I	III	V	V	V	V		II		I
Anodopetalum biglandulosum (Hook.) Hook. f.										II	I	IV	V	V	V	III	I			I
Anopterus glandulosus									I	I	I	V	V	V	V	I		I		
Blechnum wattsii Tindale	IV	III	III	V	V	V	V	V	IV	V	IV	V	V	V	V	II		I	I	II
Atherosperma moschatum	I	II		III	IV	IV	III	IV	V	V	V	V	II	IV	I			II		I
Grammitis billardieri	I	I	I	III	IV	II	V	V	IV	IV	V	V	IV	I						I
Cyathodes juniperina									I	I			II	III	III	V		II		I
Richea milliganii															I	V	II			I
Olearia persoonioides															I	IV				II
Monotoca submutica (Benth.) S.J. Jarman													I	I	II	V	V		II	
Eucalyptus vernicosa																	V		III	
Exocarpos humifusus																I	V	II	III	I
Telopea truncata		I								I		I	I	I		III	II	V		
Gaultheria hispida								I	I								I	IV		
Eucalyptus coccifera													I	I			I	V		I
Richea sprengelioides																	I	IV	III	I
Coprosma nitida	IV												I	I	I	II	IV	V	II	I
Bauera rubioides													I		II	III	V	IV	III	I
Cyathodes parvifolia																	V	IV	III	I
Oreobolus acutifolius S.T. Blake																II	III		V	I
Carpha alpina																I	I		V	I
Diplaspis cordifolia (Hook.) Hook. f.																	I		IV	I
Pentachondra pumila																	II		V	I

Table 2 (cont.)

Floristic Group:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
SPECIES																				
Celmisia asteliifolia	I																III		V	
Epacris serpyllifolia	I														I	II	V	I	V	I
Orites diversifolia										I		I	I		I	V	II	V	IV	II
Athrotaxis selaginoides												I		V	V	V	I	I	IV	IV
Astelia alpina	I														I	IV	V	IV	IV	IV
Richea scoparia																V	V	II	V	IV
Tasmannia lanceolata (Poir.) A.C. Smith	II	II	II	II	III	II	I	II	III	II	I	I	I	I	I	III	IV	V	V	V
Nothofagus cunninghamii	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Gnaphalium japonicum	III	I			I															
Epacris paludosa	III	I								I										
Pultenaea muelleri	III					I				I										
Stylidium graminifolium	III															I				
Blechnum pennamarina	III												I							I
Oxalis lactea	III	I							I	I		I						I	I	I
Pteridium esculentum	I	I	III	II	II		I	I	I		I		I							
Cotula filicula	II	I	III	II	II															
Sambucus gaudichaudiana		II	III	II	II	II	II	I			I									
Correa lawrenciana			I	III	II	II	I		I											
Hypolepis rugosula			I	I	III	I	I	I		I	I									
Isolepis inundata R. Br.					III		I	II												
Blechnum fluviatile	II	II	I	II	III	I	III	IV		I	I	I								
Uncinia tenella			I	I	III		II	II		I	I	I	I							
Pomaderris aspera			I	I	II	III	II	II			I									
Aristotelia peduncularis										II	II	III	I	I				II		
Olearia tasmanica W.M. Curtis														II	III					II
Nothofagus gunnii															III	II		I	I	II
Trochocarpa cunninghamii										I	I	I	I	II	I	III	II	II	II	III
Leptospermum nitidum												I	I		I	III	I	I		I
Archeria hirtella												I	I		I	III				I
Lomatia polymorpha														I		III				I
Persoonia gunnii																III	III	I	I	
Diplarrena latifolia																III	II		III	I
Senecio leptocarpus DC.																	III		II	II
Tetracarpaea tasmanica																II	III	I	II	II
Helichrysum backhousii																	III	I	III	
Orites revoluta																	III	III	III	I
Cyathodes straminea													I					III		I

Table 2 (cont.)

Floristic Group:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
SPECIES																				
Microlaena tasmanica (Hook. f.) Benth.																II			III	I
Archeria serpyllifolia														I	I	I	I		III	I
Sprengelia incarnata															I	I	II		III	I
Empodisma minus (Hook. f.) L. Johnson & D.F. Cutler																I	II	I	III	I
Isophysis tasmanica (Hook.) Seemann																	II		III	II
Olearia pinifolia																	I	II	III	I
Bellendena montana																		I	III	I
Gonocarpus montanus (Hook. f.) Orchard	I																	I	III	I
Uncinia compacta																			III	I
Donatia novae-zelandiae Hook. f.																			III	
Ourisia integrifolia																			III	
Podocarpus lawrencei																			III	
Acacia frigescens		I	II	II	I	I		I												
Acacia obliquinervia	I	I	I		I					I										
Acacia verticillata						I	I		I		I	I	II							
Acradenia frankliniae												I	I							
Agrostis hiemalis					I		I													
Anemone crassifolia																	II		I	II
Asperula gunnii	II			I					I			I								
Asplenium flaccidum									I	I	I									
Athrotaxis cupressoides																		I		II
Athyrium australe (R. Br.) C. Presl					I		II	II		I	I									
Australina pusilla							I		I											
Bedfordia arborescens Hochr.			I	I		I				I										
Bedfordia salicina								I	II											
Billardiera longiflora				I	I	I						I	I		I					
Blandfordia punicea (Labill.) Sweet															I	I	I			I
Blechnum patersonii						I	I	I			I									
Carex alsophila		I		I	II															
Cassinia longifolia		I				I	I	I			I									
Cassinia trinerva						I	I													

Table 2 (cont.)

Floristic Group: SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Cerastium glomeratum	I						I													
Chiloglottis gunnii	II	I	I		I			I												
Cirsium vulgare				I	I															
Coprosma hirtella	II	I	II	I	I															
Cyathea cunninghamii							I	II			I									
Cyathea marcescens								I		I	I									
Daviesia mimosoides		II																		
Dichondra repens		I		I	I															
Diselma archeri																			II	II
Dracophyllum milliganii																	I		I	I
Drosera arcturi																	I		II	I
Drymophila cyanocarpa										I		I	I							
Epilobium billardierianum	I	II		I	I															
Epilobium gunnianum	II				I															
Erigeron stellatus																	II		II	I
Eucalyptus cypellocarpa				I																
Eucalyptus nitens	II	II	II	I	I															
Eucalyptus nitida												I	II							
Eucalyptus obliqua						I				I	I	I								
Eucalyptus pauciflora	II																			
Eucalyptus subcrenulata												I								I
Eucalyptus viminalis				I	I															
Euphrasia spp.																	I			I
Euphrasia striata																	I		II	
Fieldia australis					I		II	I		I	I									
Forstera bellidifolia																	I		I	I
Gahnia sieberiana	II				I	I		I		I										
Gaultheria appressa	II	I	I	I	I															
Geranium sp.	I	I																		
Gleichenia circinnata													I		I	I				I
Gleichenia microphylla						I		I		I			I							
Gnaphalium involucratum					II		I													
Gonocarpus tetragynus Labill.	I																	I		
Gonocarpus teucrioides DC.					I	I														
Helichrysum hookeri	I																			
Helichrysum pumilum																	I		I	
Helichrysum thyrsoideum	I				I															
Holcus lanatus		I			I		I													

Table 2 (cont.)

Floristic Group:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
SPECIES																				
Hydrocotyle algida	II	I				I	I	I												
Hydrocotyle sibthorpioides	I			I					I	I										
Hypochaeris radicata	II				I															
Hypolepis punctata			I	I			I	I												
Isolepis subtilissima Boeck.	I				I		I													
Juncus gregiflorus	II																			
Juncus pauciflorus	I			I	I															
Lagenifera stipitata	II	I	I	I																
Lagarostrobos franklinii (Hook. f.) Quinn												I	I							
Lastreopsis shepherdii					I	II	II	II		I	I									
Lepidosperma elatius		I	I	II	II	II	II	I	I	I		I								
Leptospermum glaucescens													II							
Leptospermum lanigerum				I	I					I										
Leptospermum spp.												I	I							
Leucopogon gelidus	II	I																		
Leucopogon maccraei	II				I															
Libertia pulchella	II			I	I	I	I	I		I		I	I							
Lotus corniculatus	I			I																
Luzula campestris sp. agg.	II	I	I		I													I		
Lycopodium fastigiatum	I											I	I			I				
Melaleuca squarrosa						I	I			I	I	I								
Mentha laxiflora	I	I		I	II															
Microcachrys tetragona																			II	
Microlaena stipoides				I			I													
Milligania densiflora Hook. f.																			II	
Monotoca glauca									I				II							
Nertera reptans	II	I	I		I															
Notelaea ligustrina	I	I	II	I	I	I	I	I	II		I	I	I							
Olearia ledifolia																		I	I	I
Olearia lirata				I	I	I	II	I	II											
Oreobolus pumilio																	II		II	
Oreomyrrhis eriopoda	II																			
Oreomyrrhis sessiliflora																		II		
Orites milliganii																			I	II
Oxalis corniculata			I		II															I
Persoonia arborea		I	II	I	I			I		I										
Phebalium bilobum					I			I		I										

Table 2 (cont.)

Floristic Group:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
SPECIES																				
Phebalium squameum		I			I								II							
Phebalium squamulosum			I	I	I	I														
Pimelea axiflora		I		I	I	I	II													
Pimelea cinerea										I	I									
Pimelea drupacea										I	I									I
Pimelea sericea																			I	
Pimelea sp.												I								
Prostanthera cuneata	II	I																		
Prostanthera lasianthos	I	II	I	II	II	II	II	I	I	I										
Prostanthera melissifolia			I	I																
Prunella vulgaris	I				I			I												
Ranunculus plebeius	II	I		I	I															
Rubus fruticosus sp. agg.	I	I	I	I	I	I	I	I		I	I									
Rubus parvifolius		I	I	I	I	I														
Senecio gunnii	II			I																
Senecio primulifolius																			I	I
Senecio velleioides			I		I															
Sticherus lobatus				I	I	I		I												
Sticherus tener					I	I			I	I	I	I	I		I					
Tmesipteris billardieri					I		I	I		I	I									
Todea barbara					II	II	I	I		I	I									
Uncinia flaccida		I	I																	
Uncinia riparia				I														II		
Urtica incisa		II	II	II	II	II	I		I	I	I									
Zieria arborescens		I	II	I	II	II	I	I	II		I									

Table 3. Constancy table for Orders, Alliances and Associations (see Table 2 for legend).

Association Groups:	1	2	3	4	5	6	7	8	9
Number of Sites:	25	90	50	48	23	7	14	7	13
1.1.1: Poa-Acaena Association									
Acaena novae-zelandiae	V	I	I				I		I
Olearia phlogopappa	IV	III							
Poa australis	IV	I	I				II	III	
1.1.2: Eucalyptus-Clematis Association									
Acacia dealbata	II	IV	II						
Australina muelleri	II	IV	I						
Clematis aristata	I	V	I						
Eucalyptus regnans	I	IV	I						
Hedycarya angustifolia		IV	I						
1.1.0: Dicksonia-Polystichum Association									
Microsorium diversifolium		III	IV	I					
1.1: Dicksonia-Polystichum Alliance									
Dicksonia antarctica	IV	V	V	I	I				
Polystichum proliferum	V	IV	V	I			I		
1.2.1: Richea-Archeria Association									
Agastachys odorata				I	IV	IV	I		
Archeria eriocarpa				I	IV	II			II
Prionotes cerinthoides			I	I	V	IV	II	I	III
Richea pandanifolia			I	I	V	III	II	II	V

Association Groups:	1	2	3	4	5	6	7	8	9
1.2: Anodopetalum-Anopterus Alliance									
Anodopetalum biglandulosum			I	V	V	III	I		I
Anopterus glandulosus			I	V	V	I	I		
Eucryphia lucida			II	V	III				
Phyllocladus aspleniifolius			I	IV	V	V	I		I
1: Atherosperma-Blechnum Order									
Atherosperma moschatum	I	III	V	IV	II		I		I
Blechnum wattsii	III	V	IV	V	V	II	I	I	II
Grammitis billardieri	I	IV	V	IV	I				I
2.0.1: Richea-Cyathodes Association									
Cenarrhenes nitida			I	II	II	V	II		
Cyathodes juniperina			I	I	III	V	I		I
Eucryphia milliganii					III	V	III	II	II
Monotoca submutica				I	I	V	II	II	
Olearia persoonioides					I	IV			II
Richea milliganii					I	V	I		I
2.0.2: Coprosma-Cyathodes Association									
Bauera rubioides				I	I	III	IV	III	I
Coprosma nitida	II			I	I	II	IV	II	I
Cyathodes parvifolia							V	III	I
Exocarpos humifusus						I	IV	III	I
Telopea truncata	I		I	I	I	III	IV		

Table 3 (cont.)

Association Groups:	1	2	3	4	5	6	7	8	9
2.0.3: Pentachondra-Carpha Association									
Carpha alpina						I	I	V	I
Celmisia asteliifolia	I						II	V	
Diplaspis cordifolia							I	IV	I
Epacris serpyllifolia	I				I	II	III	V	I
Oreobolus acutifolius						II	II	V	I
Pentachondra pumila							I	V	I
2: Tasmannia-Astelia Order									
Astelia alpina	I				I	IV	V	IV	IV
Athrotaxis selaginoides				I	V	V	I	IV	IV
Orites diversifolia			I	I	I	V	IV	IV	II
Richea scoparia						V	III	V	IV
Tasmannia lanceolata	II	II	II	I	I	III	V	V	V
Constant Species									
Nothofagus cunninghamii	V	V	V	V	V	V	V	V	V
Other Species									
Dianella tasmanica	III	I	I						
Leptospermum grandifolium	III	I	I	I			I		
Viola hederacea	II	III					I		
Polyscias sambucifolia	II	III	I						
Histiopteris incisa	II	III	II	I					
Pittosporum bicolor	I	III	II	II					
Tetrarrhena juncea		III	I						
Gahnia grandis		I	I	III	III	II	II	II	
Leptospermum nitidum				I	I	III	I		I
Archeria hirtella				I	I	III			I
Lomatia polymorpha					I	III			I

Table 3 (cont.)

Association Groups:	1	2	3	4	5	6	7	8	9
Persoonia gunnii						III	II	I	
Diplarrena latifolia						III	I	III	I
Trochocarpa cunninghamii			I	I	I	III	II	II	III
Gaultheria hispida		I	I				III		
Eucalyptus coccifera				I	I		III		I
Helichrysum backhousii							II	III	
Richea sprengelioides							III	III	I
Eucalyptus vernicosa							III	III	
Orites revoluta							III	III	I
Microlaena tasmanica						II		III	I
Archeria serpyllifolia					I	I	I	III	I
Sprengelia incarnata					I	I	I	III	I
Empodisma minus						I	II	III	I
Isophysis tasmanica							I	III	II
Olearia pinifolia							II	III	I
Bellendena montana							I	III	I
Gonocarpus montanus	I						I	III	I
Uncinia compacta								III	I
Donatia novae-zelandiae								III	
Ourisia integrifolia								III	
Podocarpus lawrencei								III	

Table 4. *Poa—Acaena* Association (1.1.1) (legend for all subsequent tables: +, 1–5 = cover-abundance values (Braun-Blanquet, 1964); X = present; D = dominant (Kirkpatrick, 1980); . = alignment marker).

```
                              NNNNNNNPPPPNNNNNNNNNNNNPP
                              CCCCCCCGGGGCCCCCCCCCCCCGG
         Sites                0000000333000000000001031
                              5542222233122111131433413
                              7673120234954456748835129

1.1.1.1: Wittsteinia vaccinacea Sub-association
-----------------------------------------------

Carex appressa                 ++111142 + +
Coprosma nitida                 11   ++11+
Dianella tasmanica            + 2+   ++111   +   1  112
Geranium potentilloides        +  1+ 11+1         ++  +
Leptospermum grandifolium     343 3322212   1+1
Tasmannia xerophila           +1  +++  11
Wittsteinia vacciniacea       +2 21+2 1+1++

1.1.1.2: Eucalyptus delegatensis Sub-association
------------------------------------------------

Australina muelleri                        1211211  + +
Eucalyptus delegatensis       1          12+ 2+ 22 1133
Olearia phlogopappa                 ++121222+2+1+  1211

Character species of the Association
------------------------------------

Acaena novae-zelandiae        ++11+++1111 1 +1 +++++1+2
Poa australis                 +12 ++2 411+12+31 1 1 214

Character species of the Alliance
---------------------------------

Dicksonia antarctica          ++        +1++2+53322 +1+
Polystichum proliferum        11+11+++1111+1+1+3132+422
```

Table 4 (cont.)

Sites	NC057	NC056	NC047	NC023	NC021	NC022	NC020	PG322	PG333	PG334	PG319	NC025	NC024	NC014	NC015	NC016	NC017	NC034	NC018	NC048	NC033	NC135	NC041	PG312	PG139
Character species of the Order																									
Atherosperma moschatum	2		2														+	+	3						
Blechnum wattsii	2	+	2	1	+	+				2	3	3	3					+	+		3			1	
Grammitis billardieri	+		+															+							
Constant Species																									
Nothofagus cunninghamii	4	2	4	1	2	2	2	+	2	2	2	2	2	2	+	1	2	2	2	3	3	1	3	1	+
Other Species																									
Acacia dealbata									+	1	+	+	1	2						1	3				
Acacia frigescens																								2	
Acacia melanoxylon														1	1		1		+	3					
Acacia obliquinervia	1																						2		3
Asperula gunnii		+			+		+				1														
Astelia alpina		+																							
Blechnum fluviatile	1				+						+					+	1		1						
Blechnum nudum															1										
Blechnum pennamarina	+	2		+	1	1	1																		
Carex alsophila															1										
Cassinia aculeata								1		+	1					+								+	
Cassinia longifolia																+									
Celmisia asteliifolia						+																			
Cerastium glomeratum								+			+														
Chiloglottis gunnii				+	+	+					+								+						
Clematis aristata																					+				
Coprosma hirtella								+		1	+					1			1						
Cotula filicula								1	1	+														+	+
Daviesia mimosoides																2			+					1	
Dichondra repens														+	+										

Table 4 (cont.)

Sites	NC057	NC056	NC047	NC023	NC021	NC022	NC020	PG322	PG333	PG334	PG319	NC025	NC024	NC014	NC015	NC016	NC017	NC034	NC018	NC048	NC038	NC135	NC041	PG312	PG139
Dryopoa dives																							+	1	
Epacris paludosa		+		1	+	+			1			1	+												
Epacris serpyllifolia									+																
Epilobium billardierianum		+							1						1	+			+						+
Epilobium gunnianum					+	+		2			1														
Eucalyptus nitens									+	3	2			+	+			+							
Eucalyptus pauciflora				2	+	+	1																		
Eucalyptus regnans								+							+										
Gahnia sieberiana	.					.		+	+	+	+					.					.				
Gaultheria appressa	+					+		+			+	+													
Geranium sp.			+																				+		
Gnaphalium japonicum				+	+	+		1	+						+				+						
Gonocarpus montanus											+														
Gonocarpus tetragynus							+			+															
Helichrysum hookeri									+	+															
Helichrysum thyrsoideum								+			+														
Histiopteris incisa												+		+				+	+				+	+	
Holcus lanatus																									+
Hydrocotyle algida	+	+			2		1						+										+		
Hydrocotyle hirta			+					1		1	2										+				+
Hydrocotyle sibthorpioides									1																
Hypochaeris radicata								2	+		1														
Isolepis subtilissima	.				2	.										.					.				
Juncus gregiflorus								2	1		+														
Juncus pauciflorus								1		1															
Lagenifera stipitata					1		+		+		1													+	+
Lepidosperma elatius																					+				
Leucopogon gelidus						+				+	+	1													
Leucopogon maccraei								1	2	5	3														
Libertia pulchella	1		2			+				+															
Lomatia fraseri																+									
Lotus corniculatus								1	+																
Luzula campestris	+							1			1														+
Lycopodium fastigiatum					+																				
Mentha laxiflora								1																+	+
Nertera reptans									1	1	2														+
Notelaea ligustrina								+														1		1	

Table 4 (cont.)

Sites	NC057	NC056	NC047	NC023	NC021	NC022	NC020	PG322	PG333	PG334	PG319	NC025	NC024	NC014	NC015	NC016	NC017	NC034	NC018	NC048	NC033	NC135	NC041	PG312	PG139
Oreomyrrhis eriopoda			+				2	1			2														
Oxalis lactea				+	1	1		1			1										+				
Persoonia arborea																							+		
Phebalium squameum																						3			
Pimelea axiflora																					1				
Pittosporum bicolor									+	+										+		1			
Polyscias sambucifolia									+	1	1	1	+	+					+					2	
Prostanthera cuneata		+		3	1	1						1	3												
Prostanthera lasianthos	.					.				1	+			1		.					1			1	
Prunella vulgaris								+			+														
Pteridium esculentum								+																1	
Pultenaea muelleri		+	1	+		+	2																		
Ranunculus plebeius								1	+	+	1								+						
Rubus fruticosus								+			+														+
Rubus parvifolius																1									
Sambucus gaudichaudiana														+		+				+	+				
Senecio gunnii								+	+		+														
Senecio linearifolius		+							+		1				1	1							+		2
Stellaria flaccida											1									+			+		1
Stylidium graminifolium						+	+		+	1	+														
Tasmannia lanceolata			2							1	+						+			1		1			
Telopea truncata																						+			
Uncinia flaccida	.					.										.							+		+
Urtica incisa																1	+	2							
Viola hederacea				+	2	1	1			+	+											1		1	2
Zieria arborescens																					+				

Table 5. *Eucalyptus—Clematis* Association (1.1.2) (see Table 4 for legend).

```
                            PPPPPPPPPPNPPPNPPPPPPPPPPPPPP0PPPPPPPP2PNPNPP2NNNNNNNPPPPNP2NNN22NN222NN22N0NNNP0PPNNNNPNN
                            GGGGGGGGGGCGGGCGGGGGGGGGGGGGG9GGGGGGGG7GCGCGG7CCCCCCCGGGGCG7CCC88CC778CC77C9CCCG9GGCCCCGCC
         Sites              300122333113100011011111111232011012121010101100000000100101000000000001000000000010000010
                            139500122603981738944936379300727773131314223104011424827541025205511154213103590393433385
                            023934443912373642421058602521384291135718792363702586084902493010217846561232109690456315

1.1.2.1.1: Stellaria flaccida Variant
-------------------------------------

Cassinia aculeata           ++  +3 111    ++       1  11 + 11   +       +     +  +                 +   +
Dianella tasmanica          1 1 + 11++   1   +   1   +11+ ++      +      +
Dryopoa dives               + +1121+++             +    ++ 1  +  +                 +
Hydrocotyle hirta           +1++ 11  + 1 1    +    1++1++ +  ++++ +    +            +            +                 1
Senecio linearifolius       + + +1 +1+21 1         1  +1    1+                                     1
Stellaria flaccida          1+1112211  2        .  1  1    +1+211+   1        +  +  1   .   2.    .    .    .    .

1.1.2.1.2: Lomatia fraseri Variant
----------------------------------

Blechnum nudum                         23 +    1     12 21222 1131+ 54131   2   2   2       3   +      +     +
Carex appressa                      1  11 1    1   + +111+ +1 111+  +         +  11 +X+   +    +++ +++++     +   ++
Lomatia fraseri             +  21+   +            + 11+   111+1111 +   11  1   +   +  1                         +
Viola hederacea                 1   1+1 1 ++  11 1  ++1++++11 +++++++1++    +     + + +    +                  + +  1

1.1.2.1: Histiopteris incisa Sub-Association
--------------------------------------------

Acacia dealbata             212213 2 211223+2   .221 11++1+12+1+11+21 212+2 132122 1   +.   1.  +1.++  .    . 1 2.+ +
Histiopteris incisa         +1 111+121+ 1212211++121+1+1 ++12+11 1++ ++   +      211+X         + 1 ++         1
Olearia phlogopappa         1+111112231112++1+1 1111+121++  1+1+1 ++ +      +      +                +

1.1.2.2: Tetrarrhena juncea Sub-Association
-------------------------------------------

Acacia melanoxylon                     2           1 12    22 1 2 +112 1 32222+ 1   2X 5 2 22 234    12          +
Cyathea australis            +                    1  1          ++2++++ 13 121   1++ X+3 + 211 212  ++
Parsonsia brownii                       +           1        1 + 1+2++111 11   +   1+ 1 +      +  + +  +        +    +
Polyscias sambucifolia      12111+1111      1    12+ 1+1 + 22 1+1++++ +1++1 +++ 1    X
Tetrarrhena juncea          +1 1     + +2  1+    12  1 ++  22  11+4++12112+12+ + +1 +        12++1  ++        +
```

Table 5 (cont.)

```
                              PPPPPPPPPPNPPPNPPPPPPPPPPPPPP0PPPPPPPP2PNPNPP2NNNNNNNPPPPNP2NNN22NN222NN22N0NNNP0PPNNNNPNN
                              GGGGGGGGGGCGGGCGGGGGGGGGGGGGG9GGGGGGGG7GCGCGG7CCCCCCCGGGGCG7CCC88CC778CC77C9CCCG9GGCCCCGCC
        Sites                 300122333113100011011111123201101212101010110000000100101000000000000100000000010000010
                              139500122603981738944936379300727773131314223104011424827541025205511154213103590393433385
                              023934443912373642421058602521384291135718792363702586084902493010217846561232109690456315

1.1.2.3.1: Coprosma quadrifida Variant

Coprosma quadrifida                     111 +               +1 +111 ++ + +++  +++   +11X+++1+1122 + +            2+ ++++
Olearia argophylla              2 11 2 2   2  2   2        +      1 +   1+   1  +  ++ +X +1211133++1+1  +              +

1.1.2.3.2: Blechnum fluviatile Variant

Blechnum fluviatile                   1 .  1  + 11.  11+111 . 1+ 2   +     .    1  1111  +.  +   + 1 1+++. 1 1+1+  + 1 +

1.1.2.3: Asplenium bulbiferum Sub-association

Asplenium bulbiferum                         +        1  + 1   1+1                 111+ 1++2+11  1++++1+2++111111++1+ ++
Blechnum chambersii                                  11    1   11++  +   1        ++11111 1+  2  + +++++ +2  121+ 11 2 1++
Microsorium diversifolium                + 1   +1      1 ++     1 1   1  111  1   + 1 11X1+11+11++++11+2++1+++ 1++++11 1+
Pittosporum bicolor                 +  +   1 + +  +  +++12 ++ +++++1++ 1 1+  +   1 ++++X+ +++1 13+  + +++1 +  1  ++++1+
Rumohra adiantiformis                       1           +    1       ++   +   +  +  + +  X+1 + + ++1+2  2++1+ 1 11 + ++ ++

Character Species of Association

Australina muelleri           +11+11  12.2+11+1  1. 111+1211.11111+1  +1++ .   1+++12 + 1+. 112+ +21+ 1+1.+1211+1 +1+1 +
Clematis aristata              1111111 1+1+ ++11 1+ 1+1++1 1+11+1+1+++ ++++++++1 + 1+++X++++++1++++1 ++ + +++++ +++ 1
Eucalyptus regnans             2323232 2   22332113131 1 1+  32 212+31 21113211 + 221++X222  121  +2 + + + + 1 ++  +
Hedycarya angustifolia            1 +   2  1  +12+   1+21   ++ 111111+2  +11++1  +221111X+++223 112+1  2++1++112 2+1 +

Character Species of Alliance

Dicksonia antarctica          1+123232422232 223322233322225134434231333223+41234433443X24244124145442553243444333343233
Polystichum proliferum        2333253223+21312222 21421++21 +22111++++   +1+ 1 2++ 1+  X  +222+323 12+2 +1+1 1  11++2 22
```

Table 5 (cont.)

```
                              PPPPPPPPPPNPPPNPPPPPPPPPPPPPP0PPPPPPPP2PNPNPP2NNNNNNNPPPPNP2NNN22NN222NN22N0NNNP0PPNNNNPNN
                              GGGGGGGGGGCGGGCGGGGGGGGGGGGGG9GGGGGGGG7GCGCGG7CCCCCCCGGGGCG7CCC88CC778CC77C9CCCG9GGCCCCGCC
        Sites                 300122333113100011011111112320110121210101011000000001001010000000000001000000000010000010
                              1395001226039817389449363793007277731313142231040114248275410252055111542131035903934333385
                              0239344439123736424210586025213842911357187923637025860849024930102178465612321096904563 15

Character Species of Order
__________________________

Atherosperma moschatum                  + 2   2222 3 111+22+42 3 3 2 312 12 +++ 12 2222X3 1      ++ 21++ 222 2222 1 +3 3
Blechnum wattsii              2  21 223   31311222322+2122223212+2222311322+14331 21+13X2+52211232+23+2112111122122+ 1+2
Grammitis billardieri                  ++ +   ++11 1 +1+ +++1   ++ 1+1 + + + +   + 1111X1 +++ +++++1+++++1+++ 111+++1+++

Constant Species
________________

Nothofagus cunninghamii       3++321122+2+322+233313+232344+32+3+213+312133+13+42422132X3+434112233121432322323334412243

Other Species
_____________

Acacia frigescens               2 + 2 3      3    22               +     1                                      +
Acacia obliquinervia           1                             1
Acacia verticillata                                                         + +        X
Acaena novae-zelandiae         1        + ++ +   +   ++11+    1  ++                                  1         +
Agrostis hiemalis                                      +    1
Asperula gunnii                         +
Athyrium australe                                            1                       22      ++               +    +++
Australina pusilla                                                                         X
Bedfordia arborescens              1   2      1                               +
Bedfordia salicina                                                                                   1
Billardiera longiflora                    1            +          + +    +
Blechnum patersonii                                                          +       1     2        1    1            2
Carex alsophila                                   +   1    1 1    2
Cassinia longifolia                                                          +                     +    ++            1
Cassinia trinerva                                                          +            1       2
Cerastium glomeratum                                                                    +
Chiloglottis gunnii           1                           +                                                     +
Cirsium vulgare                          +                    1 +
Coprosma hirtella             +     1 1         +    +   1
Correa lawrenciana             1         2+  2  + 2 1        12  2  3+   1 4  +                1+
```

Table 5 (cont.)

```
                            PPPPPPPPPPNPPPNPPPPPPPPPPPPPP0PPPPPPPP2PNPNPP2NNNNNNNPPPPNP2NNN22NN222NN22N0NNNP0PPNNNNPNN
                            GGGGGGGGGGCGGGCGGGGGGGGGGGGGG9GGGGGGGG7GCGCGG7CCCCCCCGGGGCG7CCC88CC778CC77C9CCCG9GGCCCCGCC
         Sites              300122333113100011011111112320110121210101011000000001001010000000000001000000000010000010
                            139500122603981738944936379300727773131314223104011424827541025205511154213103590393433385
                            023934443912373642421058602521384291135718792363702586084902493010217846561232109690456315

Cyathea cunninghamii                                                                           +    +1  +      +
Cyathea marcescens                                                                                       +  +         +
Dichondra repens                          +           +
Epilobium billardierianum                1             +       +
Epilobium gunnianum                                  +  +
Eucalyptus cypellocarpa                  1        1
Eucalyptus delegatensis     + 1   2   2            +
Eucalyptus nitens           2      2 1   1           +22
Eucalyptus obliqua          .    .    .    .    .    .    .    .    .    .  + .         .    .    .    .    .
Eucalyptus viminalis                   3                      + 1
Fieldia australis                                        +                           X 2    1  221  2   +         2
Gahnia grandis                                                                                         +
Gahnia sieberiana                                     ++              1                                1    1
Gaultheria appressa                +     +    +        +
Gaultheria hispida                                                                                     +
Geranium potentilloides     +   11     1              1   +   +
Gleichenia microphylla                                                 2      2                          1
Gnaphalium involucratum                                 + +  +     ++                  +
Gnaphalium japonicum                                   +        +
Gonocarpus teucrioides                                      + +    +
Helichrysum thyrsoideum                                 1
Holcus lanatus                                          +                           +
Hydrocotyle algida          .    .    .    .    .    .    .    .    . 1  .    . +  +    .    .    .    .    .+1
Hydrocotyle sibthorpioides            1
Hypochaeris radicata                                     ++ +
Hypolepis punctata                + +         1                                 1                         +
Hypolepis rugosula                  1   +      1   2    11 11+ 1 1            +    +                         ++
Isolepis inundata                                   + +   1+  ++++                 + + +                +    ++     +
Isolepis subtilissima                                          +                  1
Juncus pauciflorus                        +             +
Lagenifera stipitata             ++      1
Lastreopsis shepherdii                                        1           +  +++ 1111X+         +       + +1 +    +
Lepidosperma elatius           1     + 2      + 1    +1   1     1    1 11  ++        X   +   +1            +
Leptospermum grandifolium                 2  3                         2
Leptospermum lanigerum                             +     1    21
Leucopogon maccraei                                        +
Libertia pulchella                                    11      1++              +            + + +                    1     1
```

Table 5 (cont.)

Sites	PG310	PG032	PG093	PG159	PG203	PG204	PG314	PG324	PG323	PG169	NC101	PG332	PG193	PG087	NC013	PG076	PG134	PG182	PG094	PG142	PG141	PG190	PG135	PG168	PG136	PG170	PG292	PG335	PG202	09001	PG173	PG128	PG074	PG172	PG279	PG131	PG211	PG133	27015	PG137	NC011	PG148	NC027	PG129	PG132	27013	NC006	NC043	NC007	NC010	NC012	NC045	NC028	PG146	PG080	PG028	PG174	NC059	PG140	27012	NC004	NC029	NC053	28020	28001	NC050	NC052	27011	27017	28018	NC054	NC146	27025	27016	NC031	09012	NC003	NC032	NC051	PG090	09009	PG036	PG199	NC030	NC044	NC035	NC036	PG033	NC181	NC055
Lotus corniculatus										|+|																																																																																
Luzula campestris	+									+																	+	+						+																																																												
Melaleuca squarrosa																																									1																	X																																		
Mentha laxiflora														1										1					+		+						+																																																									
Microlaena stipoides												+			+																																							+																																							
Nertera reptans	1						1																					+			1					+																																																										
Notelaea ligustrina			+	+			+															1			+																				1	+																1		+													+																				
Olearia lirata																	1						1											+			+		2			+				+												X						+	1			+							+														+					
Oxalis corniculata	.			+	1	.					.					.					.					+			+		+	+		+		+					.					.					.					.					.					.					.					.					.					.				
Persoonia arborea			1	+					1	1											+										+					+		+																																							1																		
Phebalium bilobum																																							3																																								+																		
Phebalium squameum																										1																																																																					
Phebalium squamulosum							1						1																		1									+					2																																																				
Pimelea axiflora																+									+						+									+		1												+		+	+											2	1																											
Poa australis	+			1	3	2											1							+					1																																																																		
Pomaderris apetala																																																																							|1|																												
Pomaderris aspera										1		2											1							+	+	1		+	2		2					1	3	2	1		+				1		3	+	+		+	X								3	3									+		+		+							2			
Prostanthera lasianthos		2							1			1			2				1		1			1	+			1							1	+						+						+	1		+				+	+									+		+		+			+	+											+							
Prostanthera melissifolia			2													+					+																																																																							
Prunella vulgaris																							|1|			|+|																																									|+|																															
Pteridium esculentum	+	1	1			2				+		1			+	+							+				1									1	+	+																+				X																										+									
Pultenaea muelleri																																															+																																															
Ranunculus plebeius	.					.					.	+				.					.						+														.					.					.					.					.					.					.					.					.					.				
Rubus fruticosus						+				+												1	+				+									+			+			1																						+										+																+	
Rubus parvifolius					1							1			+																	1			+									+																																																	
Sambucus gaudichaudiana		+	+	1	1					1					+	1	1						1	+	+							1		+		+				+					+			+		+			+	1	+			X			+	+		+					+										+							+			+		
Senecio gunnii																						1																																																																							
Senecio velleioides			+			1																																+																																																							
Sticherus lobatus													1							1												+																	+																																			+						+		
Sticherus tener																									+																	1		+																																																
Tasmannia lanceolata	1	+		2						+	2					+			+		+				+	1	1		+			+		+		1		1	+	+				1	1	+		1		1					+	+		X																				+					+	+	+		+					
Tmesipteris billardieri																																								+																		X										+		+				+							+			+						
Todea barbara																														+			1					+		+	2				2		1		1									X																				1														
Uncinia flaccida	+																																																																																												
Uncinia riparia										|+|																																																																																
Uncinia tenella								+		+	+								1						1			+	1		+			+		1		+		+															1	+				+				+									1							2		+	1	1			+		+		
Urtica incisa					1	1				1		1		1		+	1	+						+				1						+	+	+					+									+	+				+										+						+																				
Zieria arborescens		+		2	1								1			+									+	+							+	+						+		+			1			1					1			1		X																										+							

Table 6. *Dicksonia—Polystichum* Association (1.1.0) (see Table 4 for legend).

```
                            NNNNNNNNNNN0NNNNNPNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
                            CCCCCCCCCCC9CCCCCGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
          Sites             11111111100010100011111111001111101110010111111111
                            08723033004025541851400737331443624070033616661471
                            50277668712268709899589705898412560418297749486207

1.1.0.1: Pomaderris apetala Sub-Association

Acacia dealbata             2+++1 +1        +   1        +   + 1   +       2
Microsorium diversifolium   +1++   ++         ++++++  ++++1   ++1+1+1+++++++1+
Olearia argophylla          21 12211              2   +       +       2+   1
Pittosporum bicolor          ++21+1++   +  +     ++  +  + +    + + +     +
Pomaderris apetala          1 11+1+13                                 2+    +

1.1.0.2: Rumohra adiantiformis Sub-Association

Rumohra adiantiformis        +                      +      +  ++1++1+++++++1++

Character Species of the Alliance

Dicksonia antarctica        43+4+3+12+ 1+1 3232+1321 +331234++21324333112121 +
Polystichum proliferum      21+++1+12    2+2+33 1++1+2++222 +22+3 ++ 224+12+ 3

Character Species of the Order

Atherosperma moschatum      1+ 2+111+33121112+121332132 33313 44+  313233334+2
Blechnum wattsii            11 31 +1 124+3+112 4334+++2+   113 3 4 3 11+54+45+
Grammitis billardieri        ++++++   +++ +++1++++ +++++++ ++ +++++++1+++1++++

Constant Species

Nothofagus cunninghamii     +3323424314144434444333423342233442242+34423333244
```

Table 6 (cont.)

```
                            NNNNNNNNNNN0NNNNNPNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
                            CCCCCCCCCCC9CCCCCGCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
          Sites             11111111100010100011111111001111101110010111111111
                            08723033004025541851400737331443624070033616661471
                            50277668712268709899589705898412560418297749486207

Other Species
-------------

Acacia melanoxylon           1+          +     1                12    1
Acacia obliquinervia                   +
Acacia verticillata            +                                  +
Acaena novae-zelandiae      +
Anodopetalum biglandulosum                    +12   3   +   3        +   +
Anopterus glandulosus       . 3  .    .    .    .   2.    .+   .+   .     1
Aristotelia peduncularis          +1          +  +   +   1 ++  +     ++1++ +
Asperula gunnii                     +
Asplenium bulbiferum        11              ++        ++ +        1++   +
Asplenium flaccidum          +                            +     +           +
Athyrium australe                                        +                 +
Australina muelleri                        ++2                    + +
Australina pusilla          1
Bedfordia arborescens                                      +
Bedfordia salicina               2+
Blechnum chambersii         1 +                                +           1
Blechnum fluviatile                        +            ++          +        +
Blechnum nudum                +    21++1                                     +
Blechnum patersonii                                                   +
Carex appressa              .    .    .    .   +.    .    .    .    .    +
Cassinia aculeata                               +
Cassinia longifolia                                                   +
Cenarrhenes nitida                      +       +
Clematis aristata                   +    +            + +              +  +
Coprosma quadrifida          +     ++ + 2               +++ +      ++ 211++
Correa lawrenciana            +
Cyathea australis                      1
Cyathea cunninghamii                                                    +
Cyathea marcescens                                      +           +
Cyathodes juniperina          +                +
Dianella tasmanica            +
Drymophila cyanocarpa                           +
Epacris paludosa                                             +
Eucalyptus delegatensis           1   + +   +                2
```

Table 6 (cont.)

Sites	NC105	NC180	NC172	NC127	NC137	NC106	NC136	NC138	NC107	NC001	NC042	09002	NC126	NC058	NC157	NC040	NC019	PG088	NC159	NC119	NC145	NC108	NC109	NC177	NC130	NC175	NC038	NC039	NC118	NC144	NC141	NC132	NC165	NC026	NC140	NC104	NC171	NC008	NC002	NC139	NC037	NC167	NC114	NC169	NC164	NC168	NC116	NC142	NC170	NC117
Eucalyptus obliqua												+																				+																2		
Eucalyptus regnans	+	+		+						+				2	+		2	+									1											+												
Eucryphia lucida			3												2														1			2	2									1	2		2		1		3	1
Fieldia australis																											+	+											1		1									
Gahnia grandis								+							+				+																								+							
Gahnia sieberiana												+																																						
Gaultheria hispida			+																																															
Gleichenia microphylla												+																																						
Hedycarya angustifolia						.					.	+				.					.					.		+			.					.					.					.				
Histiopteris incisa		+	+	+	+										+	+			+	+	2			+	+							+		+			1				+	+								
Hydrocotyle hirta																		1	+								+										+													
Hydrocotyle sibthorpioides									+																				1		+																			
Hypolepis rugosula															+	+															+				+		+													
Lastreopsis shepherdii																													+										+								1			
Lepidosperma elatius			1											+																			+																	
Leptospermum grandifolium						+	2			2	3																																							
Leptospermum lanigerum												2																																						
Libertia pulchella															1																																			
Lomatia fraseri														1																																				
Melaleuca squarrosa												3																										2												
Monotoca glauca			1																																															
Notelaea ligustrina			+					1																																									+	
Olearia lirata	+					.		+	2		.					.					.					.					.					.					.					.				
Orites diversifolia																									+																									
Oxalis lactea									+						1																																			
Parsonsia brownii																													+												+									
Persoonia arborea												+																																						
Phebalium bilobum												1																																						
Phyllocladus aspleniifolius													2		+				+		1																													
Pimelea cinerea																					1																						+				+			
Pimelea drupacea																										+																		+						
Poa australis														+		+																																		
Polyscias sambucifolia																																		2				+												
Pomaderris aspera																																							+											
Prionotes cerinthoides																									1																									
Prostanthera lasianthos							1					+		+																				2																
Pteridium esculentum			+																																		+													

Table 6 (cont.)

	N	N	N	N	N	N	N	N	N	N	N	0	N	N	N	N	N	P	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	C	C	C	C	C	C	C	C	C	C	C	9	C	C	C	C	C	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sites	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	0	0	1	0	1	1	1	1	1	1	1	1	1
	0	8	7	2	3	0	3	3	0	0	4	0	2	5	5	4	1	8	5	1	4	0	0	7	3	7	3	3	1	4	4	3	6	2	4	0	7	0	0	3	3	6	1	6	6	6	1	4	7	1
	5	0	2	7	7	6	6	8	7	1	2	2	6	8	7	0	9	8	9	9	5	8	9	7	0	5	8	9	8	4	1	2	5	6	0	4	1	8	2	9	7	7	4	9	4	8	6	2	0	7
Pultenaea muelleri												+																																						
Richea pandanifolia																													+																					
Rubus fruticosus														+						+										+													1					1		+
Sambucus gaudichaudiana																																							+											
Stellaria flaccida																		+																																
Sticherus tener			+																						+				+																+	+				
Tasmannia lanceolata		+	1		+		1	1			+	+						+			1				+	+				+		+	+									+				1				
Telopea truncata																										+																								
Tetrarrhena juncea												+		+																																				
Tmesipteris billardieri																															+	1													+		+			
Todea barbara										+		1																										1												
Trochocarpa cunninghamii																			+																											+				
Uncinia tenella																			+							+											+													
Urtica incisa	+																	1											+	+	+																+			
Wittsteinia vacciniacea											+																																							
Zieria arborescens			1		+				1																													+												

Table 7. *Anodopetalum—Anopterus* Association (1.2.0) (see Table 4 for legend).

```
                             NNNNNNNNNNNNNJJJJJJHNNNJHNNNNNNNHHBBBBBBBBBNNNNN
                             CCCCCCCCCCCCCKKKKKKPCCCKPCCCCCCCPPHHHHHHHHHCCCCC
        Sites                111111111111122222201113011111110000000000011111
                             813445556666836666608362058912580100000000012551
                             231890181236350123475303167020469012345678955231

1.2.0.1: Trochocarpa gunnii Sub-Association
___________________________________________

Cenarrhenes nitida                                   X     ++XXXXXXXXXXX++ 1
Gahnia grandis                ++    ++      321 X       +2+21XX    XXXXX+1212
Trochocarpa gunnii              21+                1   + ++1   XXXXXXX X 2+22

Character Species of Alliance
_____________________________

Anodopetalum biglandulosum   +1  22221122+34+334X2 13X   +3++XXXXXX X.XX2+13
Anopterus glandulosus        +223121+1+1+++++422X+212X   2++2XXXXXXXXXXX1+12
Eucryphia lucida             222+332122233324244 3223X223 222X XXXXXXX X23333
Phyllocladus aspleniifolius   12++ ++1  +1    +  ++1  1+12121XXXXXXXXXXX+1+2+

Character Species of Order
__________________________

Atherosperma moschatum       422222212223134423+X122  3321+1            +2+1
Blechnum wattsii             112 +++114422113222X2+12X   +1+2XX XXXXXXXX++33+
Grammitis billardieri        1+++++++1+++ ++++ + 1+1  +++++++  XX X XX X++ ++

Constant Species
________________

Nothofagus cunninghamii      312112442434255+324X1214X3243332XXXXXXXXXXX32223
```

Table 7 (cont.)

Sites	N	N	N	N	N	N	N	N	N	N	N	N	N	J	J	J	J	J	J	H	N	N	N	J	H	N	N	N	N	N	N	N	H	H	B	B	B	B	B	B	B	B	B	N	N	N	N	N
	C	C	C	C	C	C	C	C	C	C	C	C	C	K	K	K	K	K	K	P	C	C	C	K	P	C	C	C	C	C	C	C	P	P	H	H	H	H	H	H	H	H	H	C	C	C	C	C
	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	0	1	1	1	3	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	8	1	3	4	4	5	5	5	6	6	6	6	8	3	6	6	6	6	6	0	8	3	6	2	0	5	8	9	1	2	5	8	0	1	0	0	0	0	0	0	0	0	0	1	2	5	5	1
	2	3	1	8	9	0	1	8	1	2	3	6	3	5	0	1	2	3	4	7	5	3	0	3	1	6	7	0	2	0	4	6	9	0	1	2	3	4	5	6	7	8	9	5	5	2	3	1
Other Species																																																
Acacia melanoxylon																									X				2															2				
Acacia verticillata																				X														X					X	X	X	X						
Acradenia frankliniae																				X					X								X															
Agastachys odorata																																+				X			X									
Archeria eriocarpa	1																	2						3												X	X		X	X	X							
Archeria hirtella	.					.		1			.					.					.					.					.					.					.					.	+	
Aristotelia peduncularis												+																															1			+	
Asperula gunnii																											+																					
Athrotaxis selaginoides														2													+																					
Bauera rubioides																															+																	
Billardiera longiflora																+																										X	X					
Blechnum fluviatile	+																																															
Blechnum nudum																													1																			
Blechnum pennamarina																																																+
Coprosma nitida																															+																	
Coprosma quadrifida			+																										+																			
Cyathodes juniperina																															+				X					X	X	X	X					+
Cyathodes straminea																																													+			
Dicksonia antarctica	1					.					.					.					+	1	+			.			2		.					.					.					.		
Drymophila cyanocarpa																							+								+										X	X	X					
Eucalyptus coccifera																																													+			
Eucalyptus delegatensis																																													+			+
Eucalyptus nitida				1	+											3																								X	X	X	X	X				+	
Eucalyptus obliqua			1																		+																											
Eucalyptus subcrenulata																											1																				
Gleichenia circinnata																																										X						
Gleichenia microphylla																																							X	X			X					
Histiopteris incisa															+							+					+																					
Lagarostrobos franklinii																				X					X								X	X														
Lepidosperma elatius			+																																													
Leptospermum glaucescens																																					X		X	X		X	X					
Leptospermum grandifolium				1					2	+																		+			+																	
Leptospermum nitidum		2																																										2				
Leptospermum spp.																				X													X															

Table 7 (cont.)

```
                            NNNNNNNNNNNNNJJJJJJHNNNJHNNNNNNNHHBBBBBBBBBNNNNN
                            CCCCCCCCCCCCCKKKKKKPCCCKPCCCCCCCPPHHHHHHHHHCCCCC
       Sites                111111111111122222201113011111110000000000011111
                            813445556666836666608362058912580100000000012551
                            231890181236350123475303167020469012345678955231

Libertia pulchella                       +            1 1                  1
Lycopodium fastigiatum                                  +                    +
Melaleuca squarrosa          +
Microsorium diversifolium   +  +     ++++       +
Monotoca glauca                                                + X XX X
Monotoca submutica                                                    XX
Notelaea ligustrina                            X            X
Orites diversifolia               ++                      1
Oxalis lactea                                             ++
Phebalium squameum                                          2     X   XX XX
Pimelea sp.                                    X    X
Pittosporum bicolor           + +  ++  +        + +      ++             +
Polystichum proliferum      +  +         +1 +     +     1+                 +
Prionotes cerinthoides                                                     +++2
Pteridium esculentum                                                  XX X
Richea pandanifolia               +2                  1   +
Rumohra adiantiformis               +
Sticherus tener              +       ++         +       ++
Tasmannia lanceolata          1  +                    +                  ++
Telopea truncata                                      1+                   +
Trochocarpa cunninghamii           1    3    2     +      13             1
Uncinia tenella                                       +                    +
```

Table 8. *Richea—Archeria* Association (1.2.1) (see Table 4 for legend).

Sites	J	J	J	J	J	J	J	J	J	J	J	N	J	J	J	J	J	J	J	J	J	J	J
	K	K	K	K	K	K	K	K	K	K	K	C	K	K	K	K	K	K	K	K	K	K	K
	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	B
	4	2	2	2	3	6	6	9	9	9	9	2	2	2	2	3	3	3	3	6	6	9	0
	2	3	6	7	7	5	6	1	5	6	7	9	1	4	9	0	2	3	4	8	9	3	2
1.2.1.1: Agastachys odorata Sub-Association																							
Agastachys odorata				2			2				+		2	2	2	2	+	2	2	+	2	2	X
Cenarrhenes nitida		+				2								2	2			2	2	+		+	X
Eucryphia milliganii										2		2	2	2	3	2	+	3		2	2	4	X
Character Species of Association																							
Archeria eriocarpa	3	2	1	2	+	.			2	+	+		1	2	2	3	2	1	+		2		X
Athrotaxis selaginoides	2	3	2	2	2	2	+	2	2	2	2		2	2	1	4	3	2	2	2		+	
Prionotes cerinthoides	2	2	1	1	2	2	2	1	1	1	1	2	1	+	1	1	1	1	1	1	3	1	X
Richea pandanifolia	2	1	1	+	1	2	2	+	2	2	1	1	+		2	+	2	1	+	+	1	2	X
Character Species of Alliance																							
Anodopetalum biglandulosum	2	1	4	4	1		4	3	3	2	3	1	3	2	3	3	2	2	1	2	2	+	X
Anopterus glandulosus	2	2	2	2	2	2	2	3	2	2	2	+	+	+	+	2	+	+	+	+	3	+	X
Eucryphia lucida	3	2	2	3	2	3	3	3	2		2						+						
Phyllocladus aspleniifolius	+	2	2	2	+	2	+		2	+	3	1	+	2	2	+	2	2	2	+	+	2	X
Character Species of Order																							
Atherosperma moschatum	2	+	+	2		.		+	2	+		1				+							
Blechnum wattsii	2	3	1	2	1	4	2	4	2	1	2	+	2	2		1	1	+	1		2	+	X
Grammitis billardieri			+					+															
Constant Species																							
Nothofagus cunninghamii	3	+	2	2	3	2	2	2	3	3	2	2	+	+	2	3	2	+	+	2	4	+	X

Table 8 (cont.)

Sites	JK142	JK223	JK226	JK227	JK237	JK265	JK266	JK291	JK295	JK296	JK297	NC129	JK221	JK224	JK229	JK220	JK232	JK233	JK234	JK268	JK269	JK293	JKB02
Other Species																							
Archeria hirtella																							X
Archeria serpyllifolia		+																	2				
Astelia alpina																							X
Bauera rubioides																		1		4		1	
Billardiera longiflora														+									
Blandfordia punicea	.					.					.					.		1	2		.		
Coprosma nitida									+	2											+		
Cyathodes juniperina	+				+	+		+		+	+	+	+	+				+	+	1	+		
Dicksonia antarctica												+											
Epacris serpyllifolia																						+	
Eucalyptus coccifera												+											
Gahnia grandis			+	+	3				+	+			2	+	3			3		2		1	
Gleichenia circinnata																						2	
Leptospermum nitidum																						+	X
Lomatia polymorpha										2													
Monotoca submutica					2													+		3	+		
Nothofagus gunnii													3				3	4	4			4	
Olearia persoonioides																							X
Olearia tasmanica				+	+					2			2			2	2	2	2			+	
Orites diversifolia	.					.					.					.					.		X
Richea milliganii																				+			X
Sprengelia incarnata																						1	
Sticherus tener														+									
Tasmannia lanceolata						+						1							+				X
Telopea truncata						+						+											
Trochocarpa cunninghamii					+				+	1				+									
Trochocarpa gunnii									+			2											

Table 9. *Richea—Cyathodes* Association (2.0.1) (see Table 4 for legend).

Site	J	J	J	J	J	J	J
	K	K	K	K	K	K	K
	B	B	B	B	2	B	B
	0	0	0	1	8	0	0
	3	4	9	2	6	1	5
Character Species of the Association							
Agastachys odorata	X		X	X		X	X
Cenarrhenes nitida	X	X	X	X	+	X	X
Cyathodes juniperina	X	X	X	X		X	X
Eucryphia milliganii	X	X	X	X	2	X	X
Monotoca submutica		X	X	X	+	X	X
Olearia persoonioides	X	X	X	X			X
Phyllocladus aspleniifolius	X	X	X	X	2	X	X
Prionotes cerinthoides		X	X	X	2		X
Richea milliganii	X	X	X	X	2	X	X
Character Species of the Order							
Astelia alpina	X	X	X	X			X
Athrotaxis selaginoides	X	X	X	X	3		X
Orites diversifolia	X	X	X	X		X	X
Richea scoparia	X	X	X	X	3	X	X
Tasmannia lanceolata		X		X	1		X
Constant Species							
Nothofagus cunninghamii	X	X	X	X	2	X	X
Other Species							
Anodopetalum biglandulosum	X			X	2	X	
Anopterus glandulosus					2		
Archeria eriocarpa	X	X					
Archeria hirtella	X	X		X			

Table 9 (cont.)

Site	JKB03	JKB04	JKB09	JKB12	JK286	JKB01	JKB05
Archeria serpyllifolia					+		
Bauera rubioides				X	1	X	X
Blandfordia punicea							X
Blechnum wattsii	X	X					
Carpha alpina					+		
Coprosma nitida	X	X					
Diplarrena latifolia				X		X	X
Empodisma minus					+		
Epacris serpyllifolia						X	X
Exocarpos humifusus							X
Gahnia grandis			X				X
Gleichenia circinnata							X
Leptospermum nitidum				X	+	X	
Lomatia polymorpha	X			X		X	
Lycopodium fastigiatum				X			
Microlaena tasmanica		X					X
Nothofagus gunnii			X	X			
Oreobolus acutifolius						X	X
Persoonia gunnii			X			X	X
Richea pandanifolia		X		X		X	
Sprengelia incarnata						X	
Stylidium graminifolium						X	
Telopea truncata	X			X		X	
Tetracarpaea tasmanica			X	X			
Trochocarpa cunninghamii	X	X		X	2		
Trochocarpa gunnii					+		

Table 10. *Coprosma—Cyathodes* Association (2.0.2) (see Table 4 for legend).

```
                               JJJJJJNJNNNNNN
                               KKKKKKCKCCCCCC
        Site                   ABAAAB1A111111
                               1F121G81222228
                               5 631 82123484

2.0.2.1: Eucalyptus vernicosa Sub-Association
---------------------------------------------

Epacris serpyllifolia          XXXXXX+
Eucalyptus vernicosa           DXXXXX
Eucryphia milliganii           XXXXXX      13
Exocarpos humifusus            XXXXXX X1 +
Monotoca submutica             X XXXX   .
Prionotes cerinthoides           XXXX X

2.0.2.2: Eucalyptus coccifera Sub-Association
---------------------------------------------

Eucalyptus coccifera               D + 111111
Gaultheria hispida                  X+X+  +++
Richea sprengelioides              X +X++2
Telopea truncata               X   X +X++++1

Character Species of Association
--------------------------------

Bauera rubioides               XXXXXX  222 2+
Coprosma nitida                 XX XX+X+ +++1
Cyathodes parvifolia           XXXXXX X1121 +

Character Species of Order
--------------------------

Astelia alpina                 XXXXXX1X21  12
Athrotaxis selaginoides         X        . 2
Orites diversifolia            X   X  X+++111
Richea scoparia                XXDD X4X 2
Tasmannia lanceolata             XXXX+X1++112
```

Table 10 (cont.)

	J	J	J	J	J	N	J	N	N	N	N	N	N	N
	K	K	K	K	K	K	C	K	C	C	C	C	C	C
Site	A	B	A	A	A	B	1	A	1	1	1	1	1	1
	1	F	1	2	1	G	8	1	2	2	2	2	2	8
	5		6	3	1		8	2	1	2	3	4	8	4
Constant Species														
Nothofagus cunninghamii	X	X	D	D	X	X	3	D	2	1	+	3	2	2
Other Species														
Acaena novae-zelandiae							+					+		
Agastachys odorata	X			X										
Anemone crassifolia	X			X										
Anodopetalum biglandulosum					X									
Anopterus glandulosus												+		
Archeria serpyllifolia						X								
Aristotelia peduncularis									+					+
Atherosperma moschatum								X				2		
Athrotaxis cupressoides										+				
Bellendena montana							1							
Blandfordia punicea	X													
Blechnum wattsii														+
Carpha alpina		X												
Celmisia asteliifolia	X			X		X								
Cenarrhenes nitida	X		X		X									
Cyathodes juniperina							+						+	
Cyathodes straminea							+		2	2	2			
Diplarrena latifolia	X					X								
Diplaspis cordifolia						X								
Dracophyllum milliganii	X													
Drosera arcturi						X								
Empodisma minus				X	X					+				
Erigeron stellatus	X					X								
Euphrasia spp.			X											
Euphrasia striata						X								
Forstera bellidifolia		X												
Gahnia grandis	X	X			X								+	1
Geranium potentilloides									+			1		

Table 10 (cont.)

Site	J	J	J	J	J	J	N	J	N	N	N	N	N	N
	K	K	K	K	K	K	C	K	C	C	C	C	C	C
	A	B	A	A	A	B	1	A	1	1	1	1	1	1
	1	F	1	2	1	G	8	1	2	2	2	2	2	8
	5		6	3	1		8	2	1	2	3	4	8	4
Gonocarpus montanus							+							
Gonocarpus tetragynus									+					
Helichrysum backhousii			X	X		X		X						
Helichrysum pumilum	X													
Isophysis tasmanica	X			X										
Leptospermum grandifolium									+				1	
Leptospermum nitidum					X									1
Luzula campestris								X						
Nothofagus gunnii												3		
Olearia ledifolia								X						
Olearia pinifolia						X		X	2			+		
Oreobolus acutifolius	X		X			X								
Oreobolus pumilio	X					X								
Oreomyrrhis sessiliflora									+	+			+	
Orites revoluta	X	X	X				1	X	2		+			
Oxalis lactea							+							
Pentachondra pumila			X			X								
Persoonia gunnii	X		X			X		X						
Phyllocladus aspleniifolius												+		+
Poa australis						X	1	X						
Polystichum proliferum							+					+		
Richea milliganii	X				X									
Richea pandanifolia		X				X		X	+	+				
Senecio leptocarpus			X		X	X								
Sprengelia incarnata	X				X									
Tetracarpaea tasmanica	X				X	X				+				
Trochocarpa cunninghamii		X				X		X						1
Trochocarpa gunnii						X			+	2		3	+	
Uncinia riparia									+	1				
Viola hederacea									+					

Table 11. *Pentachondra—Carpha* Association (2.0.3) (see Table 4 for legend).

	J	J	J	J	J	J	J
	K	K	K	K	K	K	K
Sites	B	1	A	B	B	A	B
	B	3	2	E	I	2	H
		2	2			5	
Character Species of the Association							
Carpha alpina	X	+	X		X	X	X
Celmisia asteliifolia		+	X	X	X	X	X
Diplaspis cordifolia	X		X		X	X	X
Epacris serpyllifolia	X	2		X	X	X	X
Oreobolus acutifolius		+	X	X	X	X	X
Pentachondra pumila	X		X	X	X	X	X
Character Species of the Order							
Astelia alpina		1	X	X	X	X	
Athrotaxis selaginoides	X	2	X	X		D	
Orites diversifolia			X	X	X	X	X
Richea scoparia	X	+	D	X	X	X	X
Tasmannia lanceolata	X	+	X	X	X	X	X
Constant Species							
Nothofagus cunninghamii	X	2	X	X	X	X	X
Other Species							
Anemone crassifolia						X	
Archeria serpyllifolia	X	2		X	X		
Bauera rubioides				X		X	X
Bellendena montana	X			X	X		X
Blechnum wattsii					X		
Coprosma nitida	X			X			
Cyathodes parvifolia	X			X		X	X

Table 11 (cont.)

	J	J	J	J	J	J	J
	K	K	K	K	K	K	K
Sites	B	1	A	B	B	A	B
	B	3	2	E	I	2	H
		2	2			5	
Diplarrena latifolia			X	X	X		
Diselma archeri	X			X			
Donatia novae-zelandiae					X	X	X
Dracophyllum milliganii						X	
Drosera arcturi					X	X	
Empodisma minus				X		X	X
Erigeron stellatus					X		X
Eucalyptus vernicosa				X	X	X	X
Eucryphia milliganii						X	X
Euphrasia striata	X						X
Exocarpos humifusus			X		X	X	
Forstera bellidifolia						X	
Gahnia grandis				X	X		
Gonocarpus montanus	X			X	X		X
Helichrysum backhousii	X			X	X	X	
Helichrysum pumilum		+					
Isophysis tasmanica					X	X	X
Microcachrys tetragona	X	+					
Microlaena tasmanica	X			X		X	X
Milligania densiflora					X		X
Monotoca submutica		+		X			
Nothofagus gunnii		4					
Olearia ledifolia	X						
Olearia pinifolia	X		X	X			
Oreobolus pumilio						X	X
Orites milliganii		+					
Orites revoluta	X			X	X		X
Ourisia integrifolia				X	X		X
Oxalis lactea			X				
Persoonia gunnii				X			
Pimelea sericea	X						
Poa australis			X			X	X
Podocarpus lawrencei	X	3			X		
Prionotes cerinthoides				X			
Richea pandanifolia					X	X	
Richea sprengelioides	X	1			X		X
Senecio leptocarpus			X	X			

Table 11 (cont.)

	J	J	J	J	J	J	J
	K	K	K	K	K	K	K
Sites	B	1	A	B	B	A	B
	B	3	2	E	I	2	H
		2	2			5	
Senecio primulifolius			X				
Sprengelia incarnata					X	X	X
Tetracarpaea tasmanica				X		X	
Trochocarpa cunninghamii	X				X		
Trochocarpa gunnii		2					
Uncinia compacta			X	X		X	

Table 12. *Tasmannia—Astelia* Association (2.0.0) (see Table 4 for legend).

Sites	JKA17	JKA24	JKA20	JKB11	JK310	JK119	JK308	JKA21	JKB08	JKB06	JK303	JK277	NC147
Characteristic Species													
Richea pandanifolia	X	X	X	X	2	1	2	X	X	X			2
Character Species of the Order													
Astelia alpina	X	X	X	X					X	X	1	3	+
Athrotaxis selaginoides	D		X	X	+	3	3	X	X	X	2		
Orites diversifolia	X			X						X			
Richea scoparia	X	D	D	X			2	X		X	2	+	
Tasmannia lanceolata	X	X	X	X	1	+	2		X	X		+	1
Constant Species													
Nothofagus cunninghamii	X	X	X	X	+	4	2	X	X	X	+	+	3
Other Species													
Acaena novae-zelandiae				X									+
Anemone crassifolia	X	X	X										
Anodopetalum biglandulosum											+		
Archeria eriocarpa						3	2		X	X			
Archeria hirtella	X												
Archeria serpyllifolia											2		
Atherosperma moschatum						5			X				
Athrotaxis cupressoides					3							3	+
Bauera rubioides											1	1	
Bellendena montana				X									
Blandfordia punicea					+						+		
Blechnum pennamarina													1

Table 12 (cont.)

Sites	JKA17	JKA24	JKA20	JKB11	JK310	JK110	JK309	JKA28	JKB01	JKB06	JK303	JK277	NC147
Blechnum wattsii		X				+	1						
Carpha alpina	X											2	
Coprosma nitida			X	X									
Cyathodes juniperina				X									
Cyathodes parvifolia		X	X										
Cyathodes straminea													+
Diplarrena latifolia		X						X					
Diplaspis cordifolia			X	X									
Diselma archeri					2						3	2	
Dracophyllum milliganii	X							X					
Drosera arcturi	X											1	
Empodisma minus											+	2	
Epacris serpyllifolia		X									2		
Erigeron stellatus	X		X										
Eucalyptus coccifera													+
Eucalyptus subcrenulata													+
Eucryphia milliganii		X		X					X	X		2	
Euphrasia spp.	X		X										
Exocarpos humifusus	X		X										
Forstera bellidifolia	X												
Gleichenia circinnata												4	
Gonocarpus montanus	X												
Grammitis billardieri									X				
Isophysis tasmanica	X	X	X										
Leptospermum nitidum				X								+	
Lomatia polymorpha				X									
Microlaena tasmanica				X									
Nothofagus gunnii					4		4	D			4	3	
Olearia ledifolia			X										
Olearia persoonioides		X						X	X				
Olearia pinifolia			X							X			
Olearia tasmanica					1	+	+				1	+	
Oreobolus acutifolius	X												
Orites milliganii			X					X			2		
Orites revoluta													1
Oxalis corniculata													+
Oxalis lactea				X									

Table 12 (cont.)

Sites	JKA17	JKA24	JKA20	JKB21	JK310	JK119	JK308	JKA21	JKB08	JKB06	JK303	JK247	NC147
Pentachondra pumila	X		X										
Phyllocladus aspleniifolius				X					X				
Pimelea drupacea						+							
Prionotes cerinthoides	X	X	X	X				X	X				
Richea milliganii		X											
Richea sprengelioides			X										
Senecio leptocarpus	X	X	X										
Senecio primulifolius		X						X					
Sprengelia incarnata												1	
Tetracarpaea tasmanica		X		X							+		
Trochocarpa cunninghamii	X	X		X		+				X			2
Trochocarpa gunnii					+		+						
Uncinia compacta		X	X										

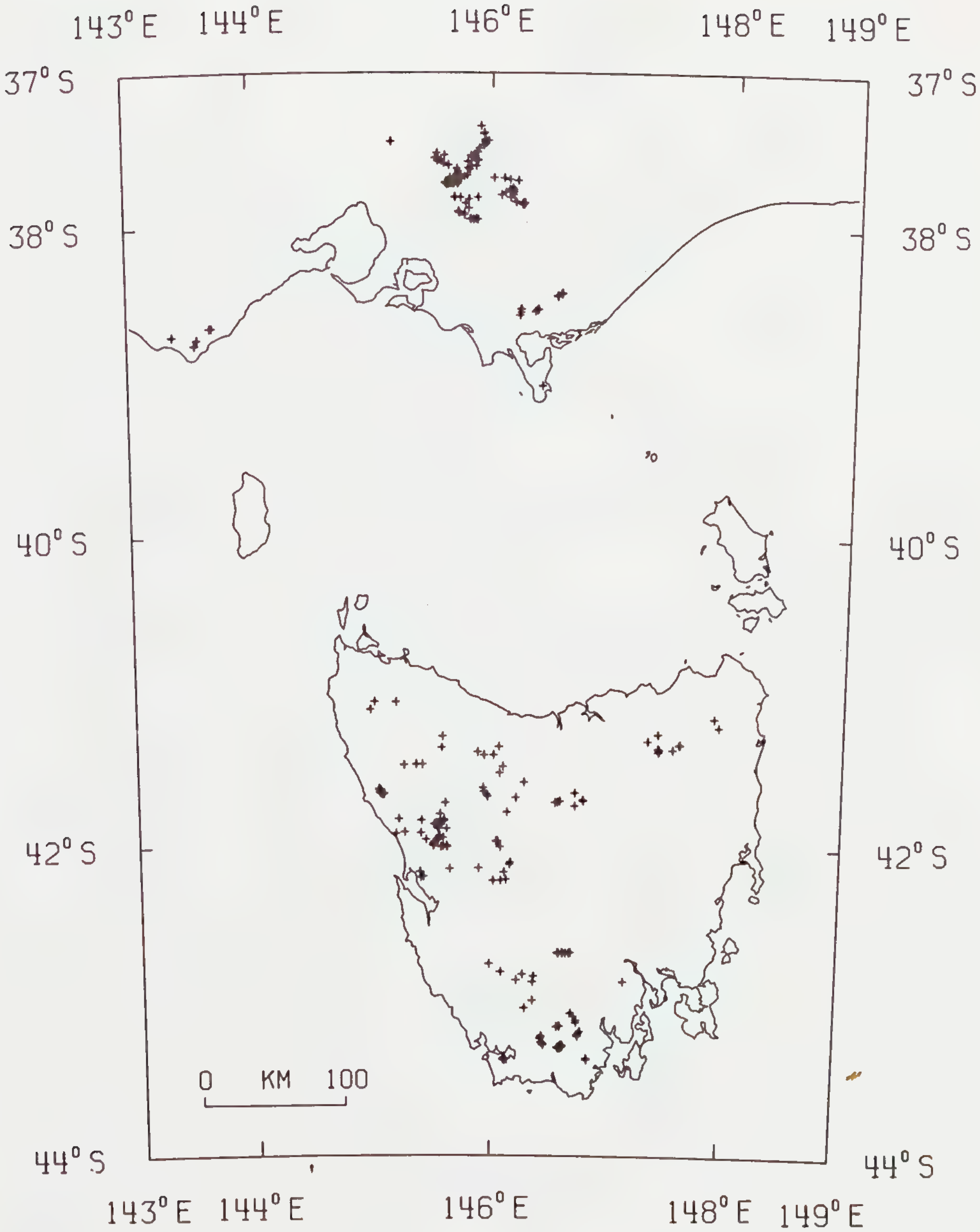

Fig. 1. Location of sample sites.

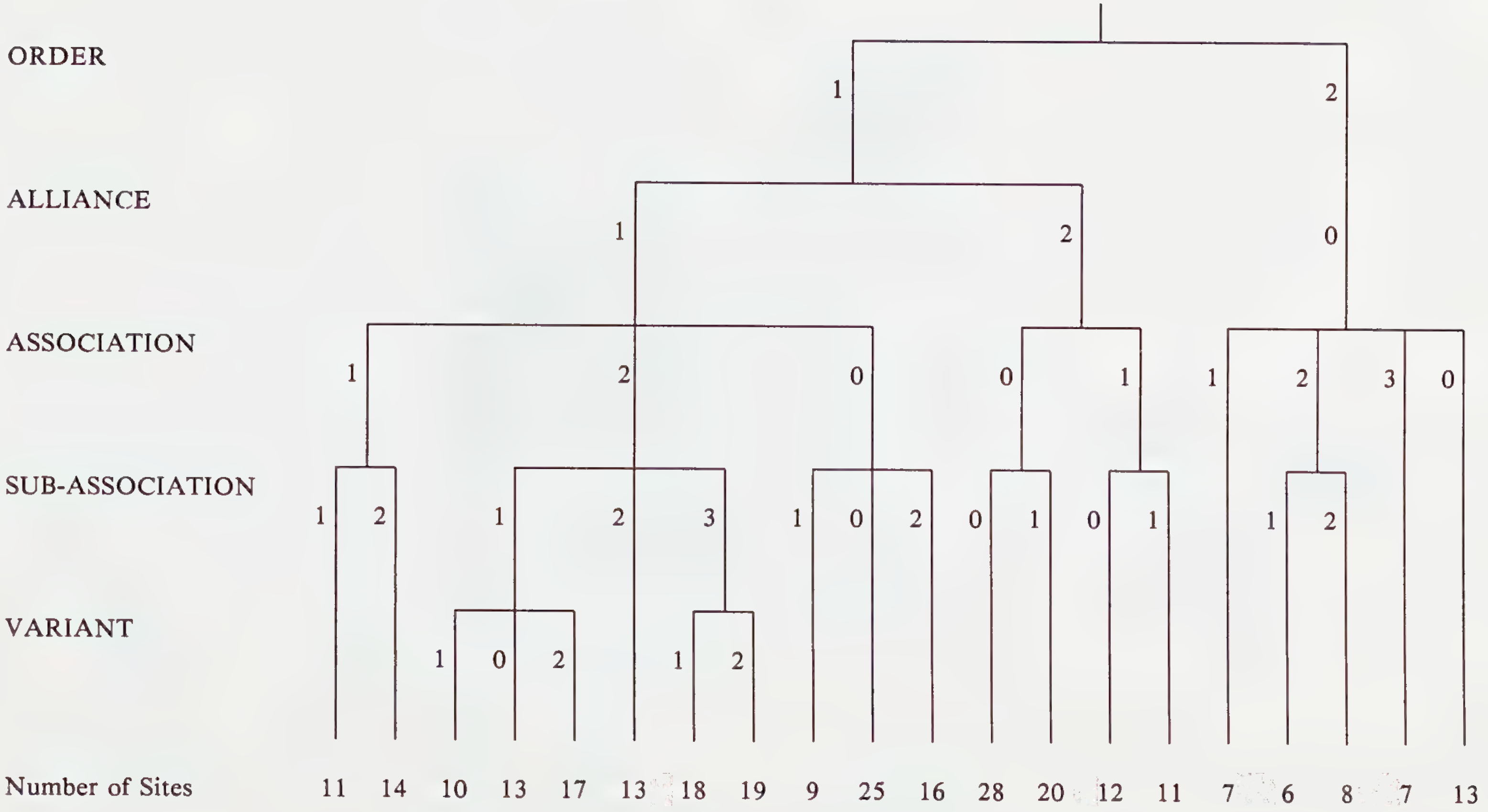

Fig. 2. Dendrogram showing relationships between groups and numbers of sites in the 20 final groups. See text for explanation of numbering system for hierarchy.

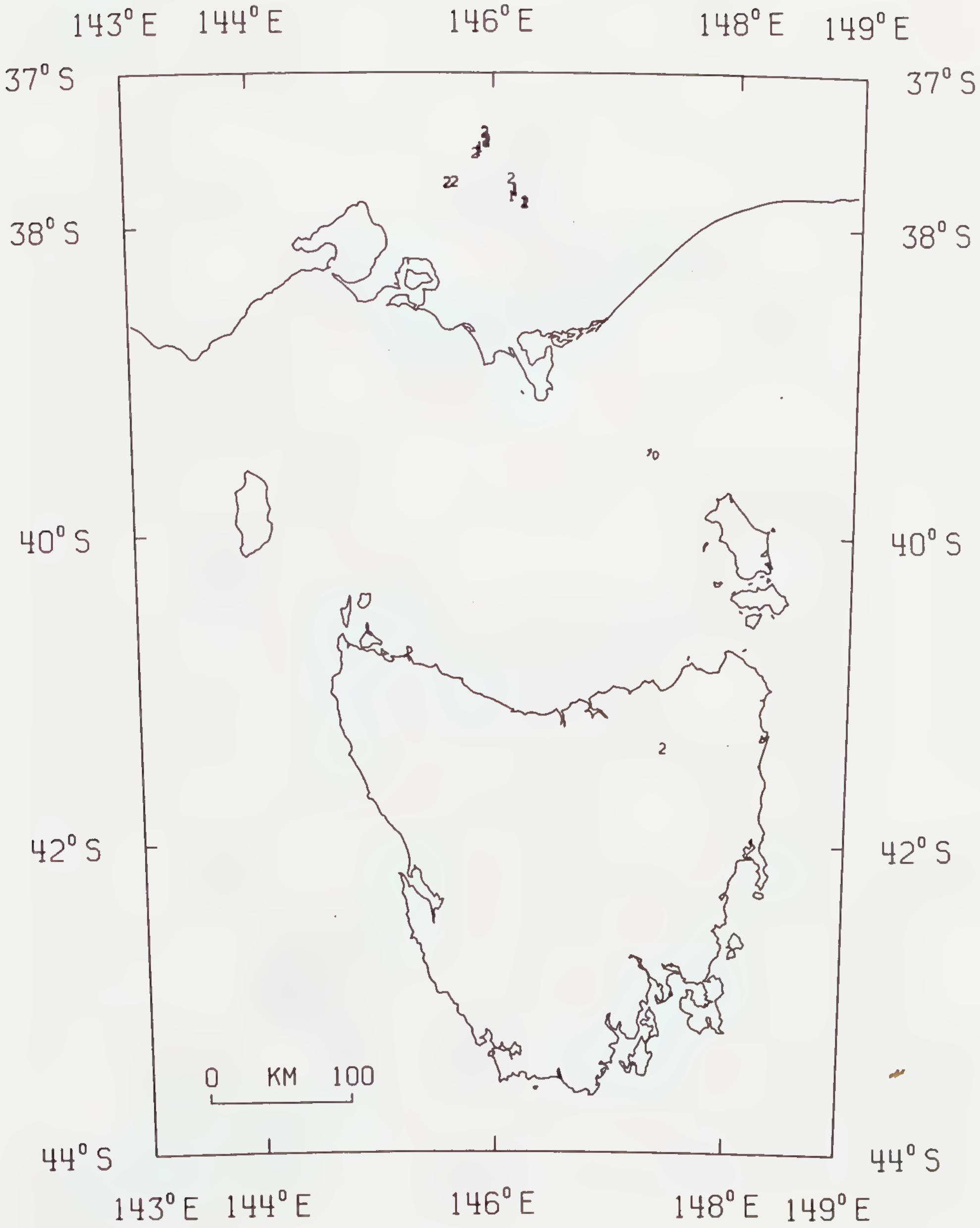

Fig. 3. *Poa—Acaena* Association (1.1.1) (1 = *Wittsteinia vacciniacea* Sub-association, 2 = *Eucalyptus delegatensis* Sub-association).

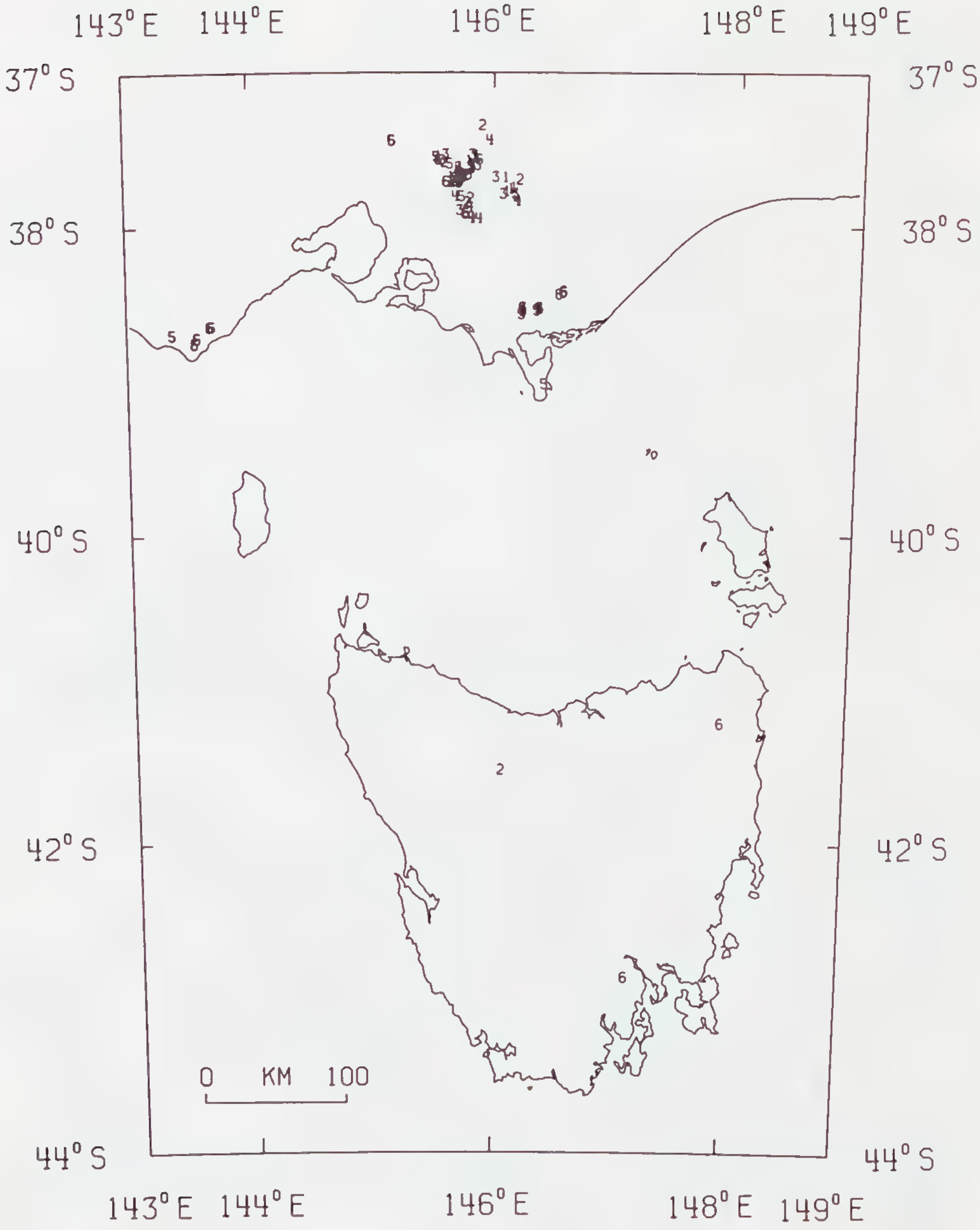

Fig. 4. *Eucalyptus—Clematis* Association (1.1.2) (1, 2 & 3 = *Histiopteris incisa* Sub-association, 1 = *Stellaria flaccida* Variant, 2 = *typicum* of Sub-association, 3 = *Lomatia fraseri* Variant, 4 = *Tetrarrhena juncea* Sub-association, 5 & 6 = *Asplenium bulbiferum* Sub-association, 5 = *Coprosma quadrifida* Variant, 6 = *Blechnum fluviatile* Variant).

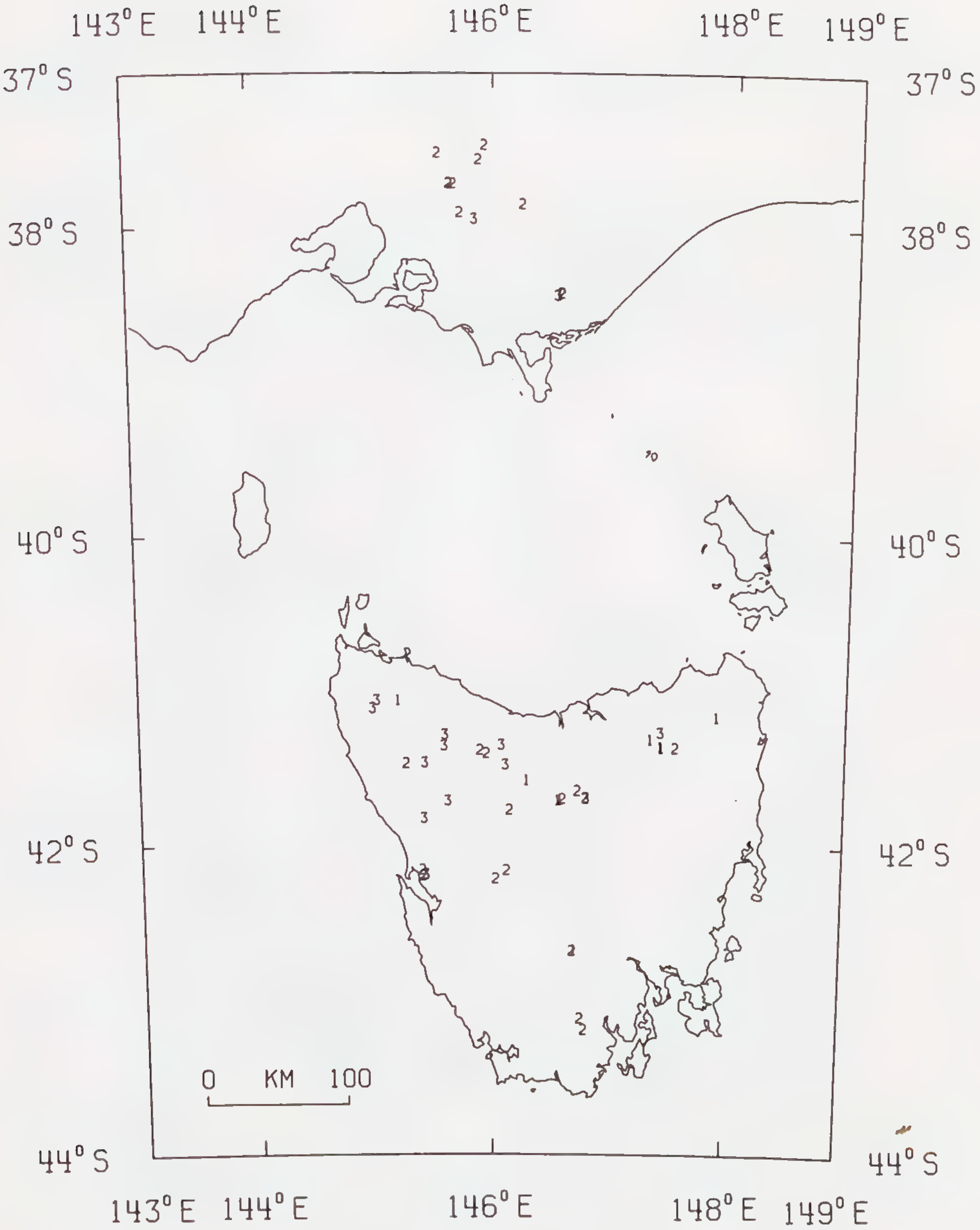

Fig. 5. *Dicksonia—Polystichum* Association (1.1.0) (1 = *Pomaderris apetala* Sub-association, 2 = *typicum* of Association, 3 = *Rumohra adiantiformis* Sub-association).

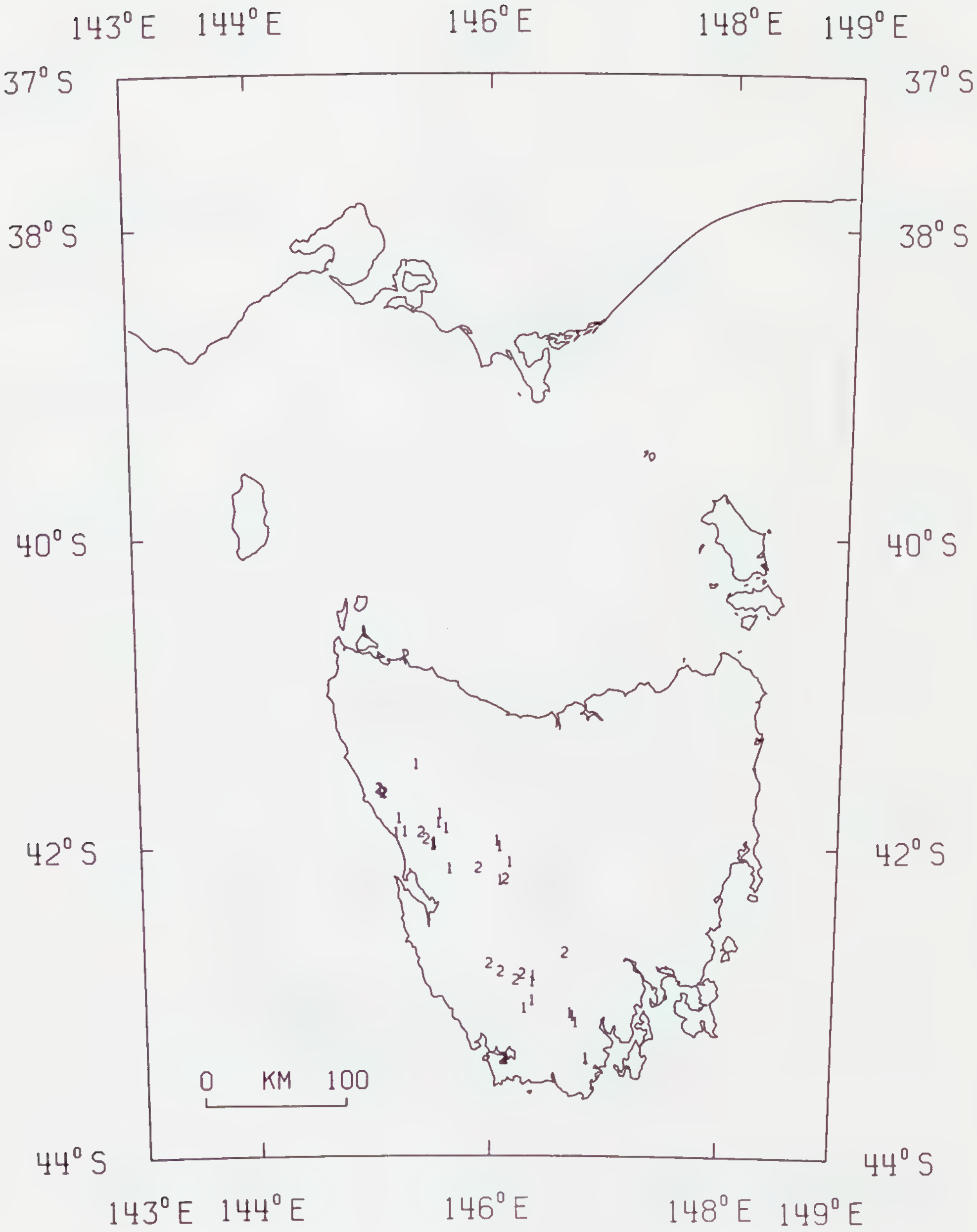

Fig. 6. *Anodopetalum—Anopterus* Association (1.2.0) (1 = *typicum* of Association, 2 = *Trochocarpa gunnii* Sub-association).

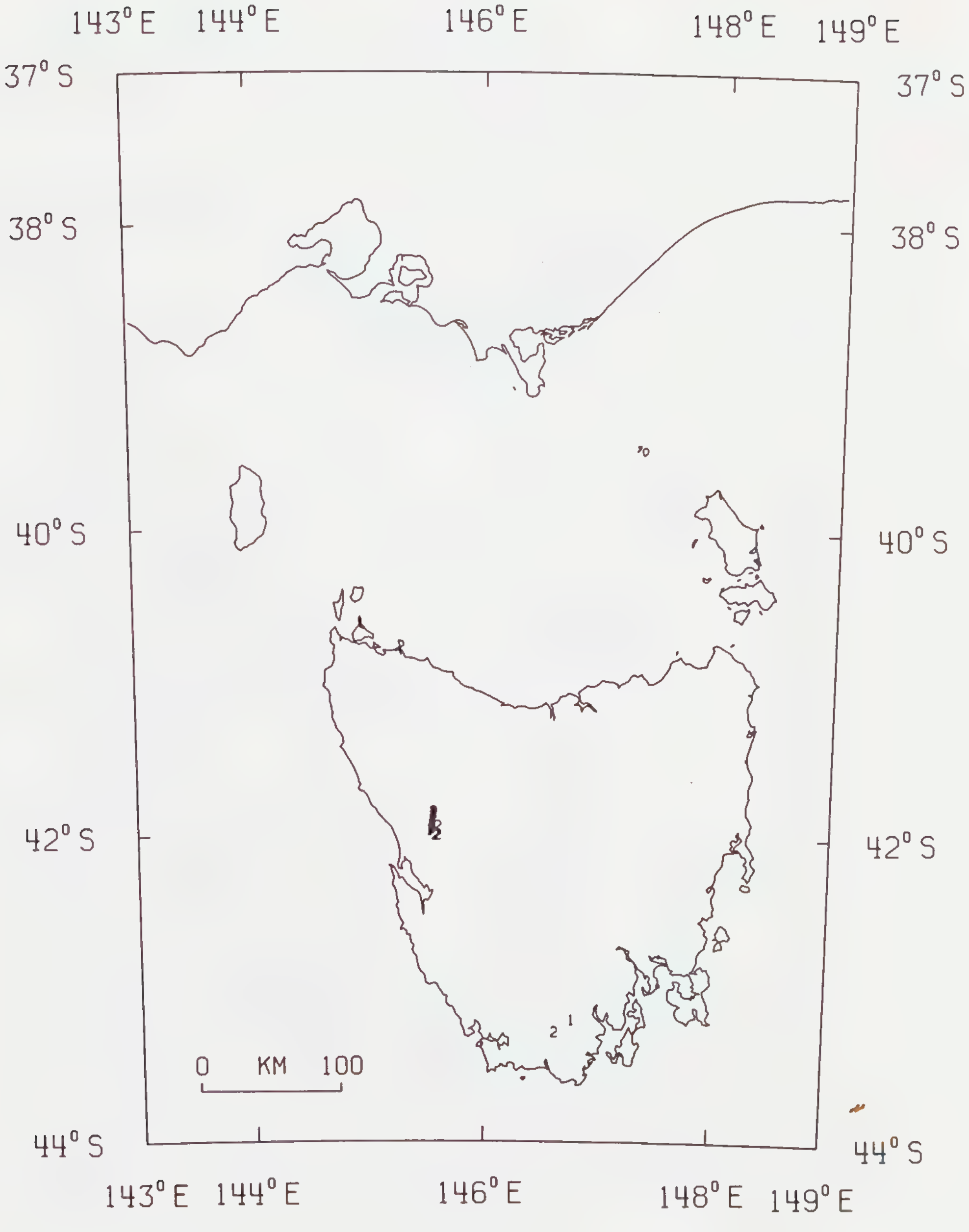

Fig. 7. *Richea—Archeria* Association (1.2.1) (1 = *typicum* of Association, 2 = *Agastachys odorata* Sub-association).

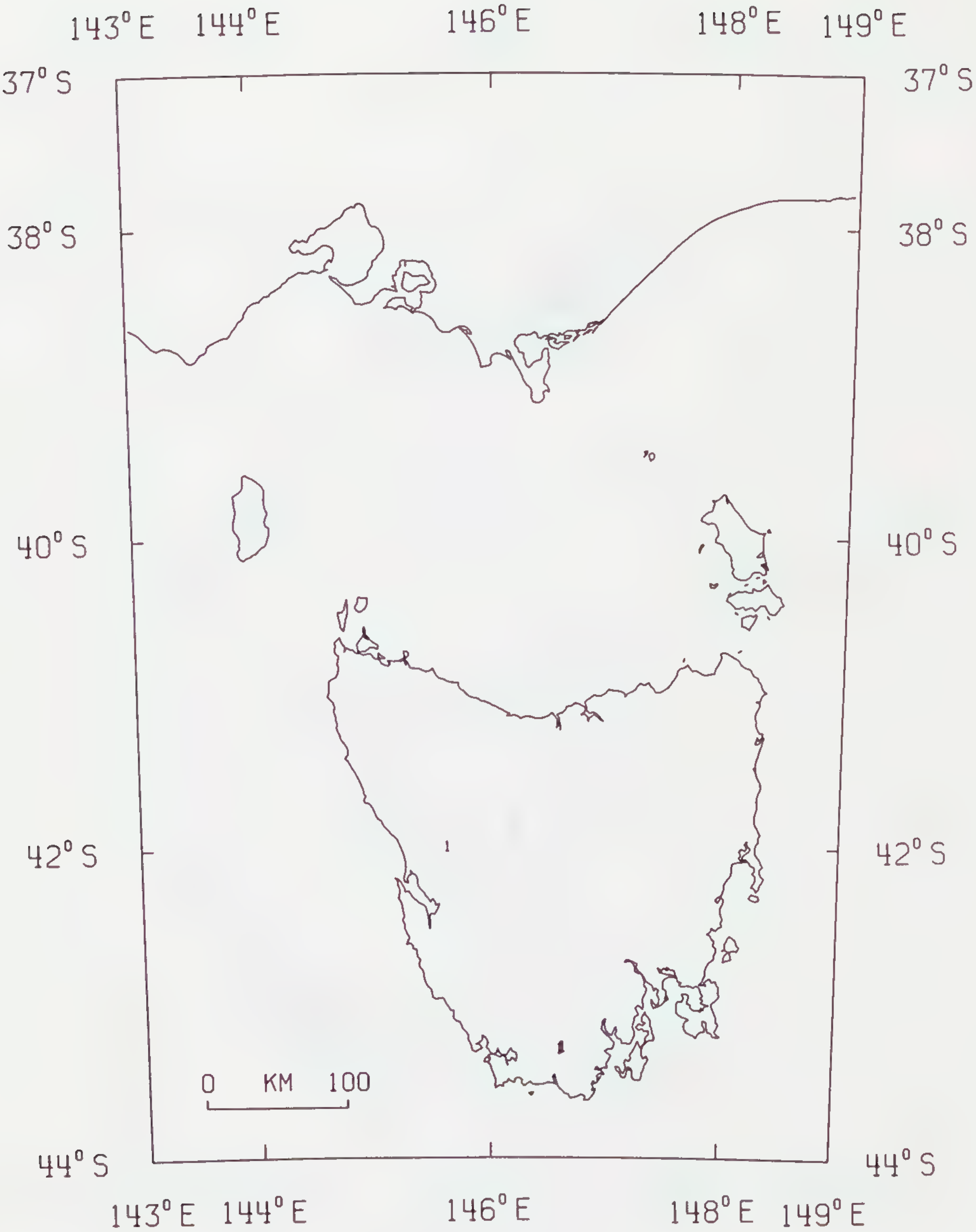

Fig. 8. *Richea—Cyathodes* Association (2.0.1).

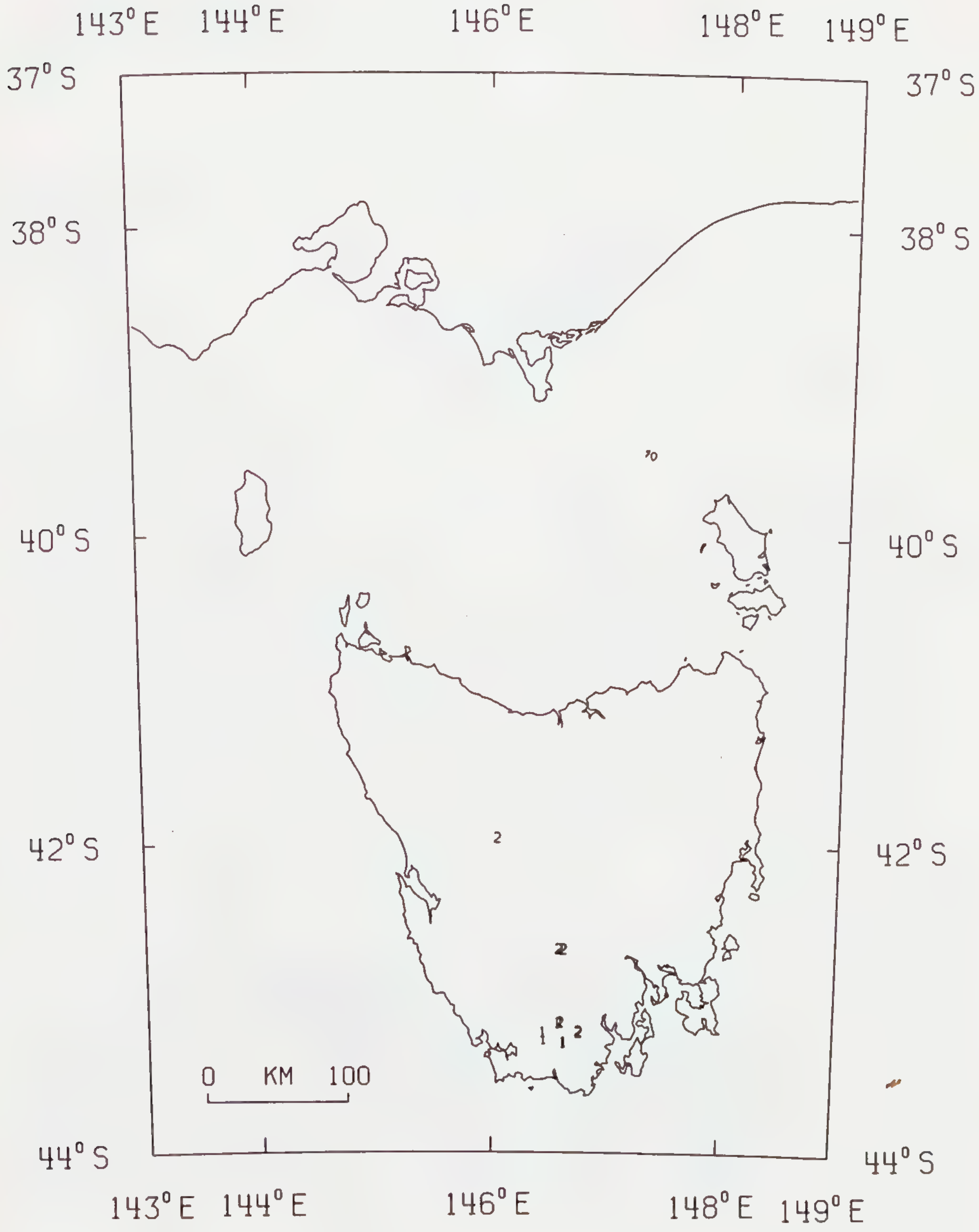

Fig. 9. *Coprosma—Cyathodes* Association (2.0.2) (1 = *Eucalyptus vernicosa* Sub-association, 2 = *Eucalyptus coccifera* Sub-association).

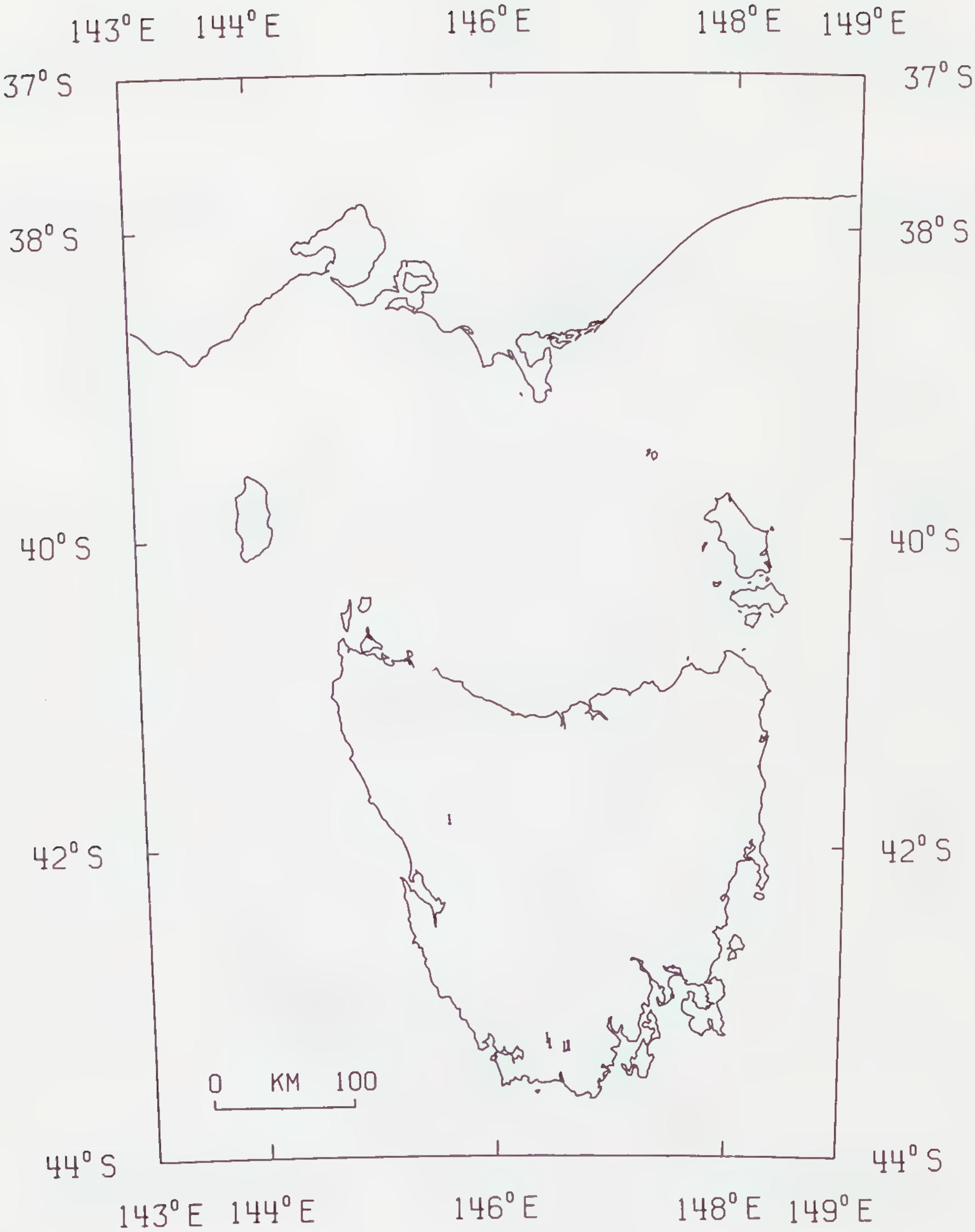

Fig. 10. *Pentachondra—Carpha* Association (2.0.3).

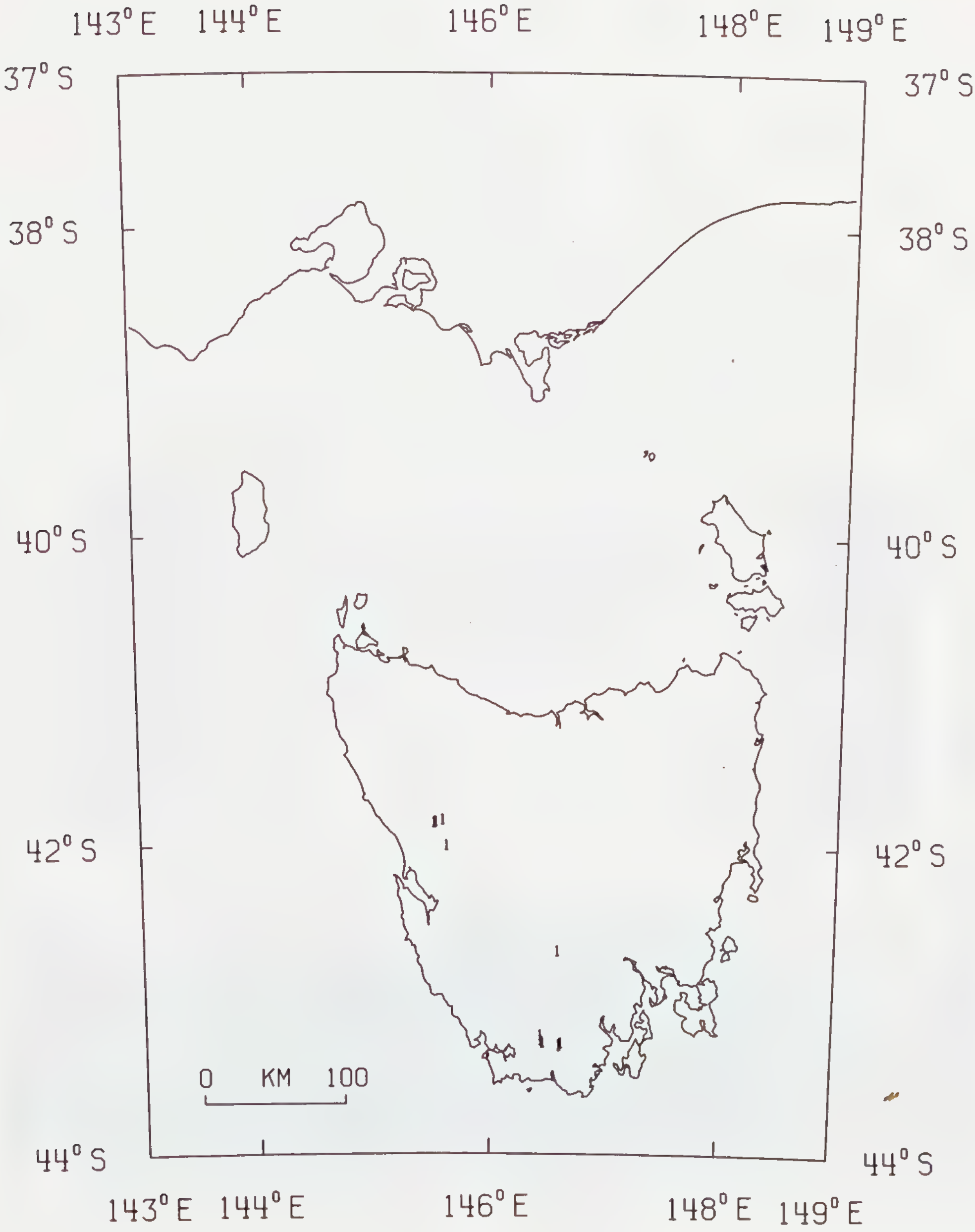

Fig. 11. *Tasmannia—Astelia* Association (2.0.0).

Appendix. Species composition of unclassified sites.

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                            NNNNPNNNNNNNNNNNNJJJHHHHHHH
                            CCCCGCCCCCCCCCCCCKKKPPPPPPP
        Sites               000021111111111111BB0000000
                            0044200134577777830A0001111
                            5969723043534689937 2351357

Acacia dealbata              +  2    2+  +
Acacia melanoxylon          2112                 XX XXX
Acacia obliquinervia            3
Acacia verticillata          +                     X  X
Acaena novae-zelandiae                      +
Acradenia frankliniae                            XX X
Agastachys odorata                             X
Anopterus glandulosus                           XXXXX
Archeria eriocarpa                            X
Archeria serpyllifolia                       2
Aristotelia peduncularis          +  + +
Asplenium bulbiferum          +1
Astelia alpina                      +        + X
Atherosperma moschatum        1 .    .    ++   .   XX X
Athrotaxis cupressoides                +     2
Athrotaxis selaginoides          2          + XX
Athyrium australe             +
Australina muelleri           ++
Australina pusilla                   1
Bauera rubioides                       32      X
Bellendena montana                  1 +        X
Blandfordia punicea                            X
Blechnum chambersii           +       +
Blechnum nudum               1 3         2
Blechnum pennamarina              ++      +
Blechnum wattsii            32 +1       1        XXXX
Carex appressa                 +.    .
Cassinia aculeata               1
Clematis aristata                    +   +
Coprosma nitida                     +  ++ ++
Coprosma quadrifida            2     +   1
Correa lawrenciana           +
Cyathea australis            +
Cyathodes juniperina                   +2 + 1
Cyathodes parvifolia                1       +
Dianella tasmanica                      +
Dicksonia antarctica         344     3
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Appendix (cont.)

Sites	NC005	NC009	NC046	NC049	PG027	NC102	NC103	NC110	NC134	NC143	NC155	NC173	NC174	NC176	NC178	NC179	NC189	JK133	JKB07	JKBA	HP002	HP003	HP005	HP011	HP013	HP015	HP017
Diplarrena latifolia																				X							
Diselma archeri																		2		X							
Dracophyllum milliganii																				X							
Drosera arcturi																		1		X							
Dryopoa dives					1																						
Empodisma minus													1							X							
Epacris serpyllifolia																		+		X							
Eucalyptus coccifera													+														
Eucalyptus cypellocarpa					2																						
Eucalyptus delegatensis																+	2										
Eucalyptus nitida																					X						
Eucalyptus obliqua		+								2	+			1							X						
Eucalyptus regnans	+	1																									
Eucalyptus subcrenulata					.							+	1							.							
Eucalyptus viminalis														+													
Eucryphia lucida											2						+					X	X			X	
Eucryphia milliganii																		2	X	X							
Gahnia grandis							2					1								X	X	X		X			
Gahnia sieberiana					+																						
Gaultheria hispida													1														
Geranium sp.																	+										
Gonocarpus tetragynus									+																		
Gonocarpus teucrioides					1																						
Grammitis billardieri						+	+					+															
Helichrysum hookeri									+																		
Helichrysum pumilum																				X							
Histiopteris incisa					.					1				+	+		1			.							
Hydrocotyle sibthorpioides								+		1				+													
Isophysis tasmanica																				X							
Lagarostrobos franklinii																					X	X	X	X	X	X	X
Lepidosperma elatius					1																						
Leptospermum grandifolium								2	1		1	+			3												
Leptospermum lanigerum					1																						
Leptospermum nitidum																				X							
Leptospermum spp.																					X	X		X	X	X	
Libertia pulchella							1				1						+										
Lomatia polymorpha																				X							

Appendix (cont.)

	N	N	N	N	P	N	N	N	N	N	N	N	N	N	N	N	N	J	J	J	H	H	H	H	H	H	H
	C	C	C	C	G	C	C	C	C	C	C	C	C	C	C	C	C	K	K	K	P	P	P	P	P	P	P
Sites	0	0	0	0	2	1	1	1	1	1	1	1	1	1	1	1	1	1	B	B	0	0	0	0	0	0	0
	0	0	4	4	2	0	0	1	3	4	5	7	7	7	7	7	8	3	0	A	0	0	0	1	1	1	1
	5	9	6	9	7	2	3	0	4	3	5	3	4	6	8	9	9	3	7		2	3	5	1	3	5	7
Lycopodium fastigiatum									+						1		+			X							
Microcachrys tetragona																		2									
Microsorium diversifolium			+											+													
Milligania densiflora																				X							
Monotoca submutica																	+										
Nertera reptans					1																						
Notelaea ligustrina																								X			X
Nothofagus cunninghamii	2	1	3	2	+	3	4	3	1	2	3	3	3	4	2	4	2	2	X	X	X	X	X	X	X	X	X
Nothofagus gunnii												+						2		X							
Olearia argophylla										1																	
Olearia persoonioides												+															
Olearia phlogopappa					2																						
Olearia tasmanica																		+									
Oreobolus pumilio					.					.					.					X					.		
Orites diversifolia																				X							
Orites revoluta								1					+														
Oxalis lactea							1								+		1										
Persoonia gunnii													+		1					X							
Phyllocladus aspleniifolius											1	+				2	+				X						X
Pimelea sericea.									1											X							
Pimelea sp.																								X			
Pittosporum bicolor	1			+			+					+		+													
Poa australis					1				+																		
Polyscias sambucifolia		1																									
Polystichum proliferum	+				1		+	+		2	+			3		+											
Pomaderris apetala														1													
Pomaderris aspera		2			.					.					.										.		
Prionotes cerinthoides																			X								
Prostanthera lasianthos					2																						
Pteridium esculentum					1																						
Richea pandanifolia												2					1		X								
Richea scoparia									+									2									
Richea sprengelioides									1																		
Rubus fruticosus				2						+																	
Sambucus gaudichaudiana														+													
Sprengelia incarnata																		1		X							
Stellaria flaccida														+													

Appendix (cont.)

Sites	N	N	N	N	P	N	N	N	N	N	N	N	N	N	N	N	N	J	J	J	H	H	H	H	H	H	H
	C	C	C	C	G	C	C	C	C	C	C	C	C	C	C	C	C	K	K	K	P	P	P	P	P	P	P
	0	0	0	0	2	1	1	1	1	1	1	1	1	1	1	1	1	1	B	B	0	0	0	0	0	0	0
	0	0	4	4	2	0	0	1	3	4	5	7	7	7	7	7	8	3	0	A	0	0	0	1	1	1	1
	5	9	6	9	7	2	3	0	4	3	5	3	4	6	8	9	9	3	7		2	3	5	1	3	5	7
Stylidium graminifolium																				X							
Tasmannia lanceolata					1		+	2	1			+	1		3	+											
Telopea truncata											1	1					+			X							
Tetracarpaea tasmanica													+														
Tetrarrhena juncea		+		1																							
Todea barbara		+																									
Trochocarpa cunninghamii												+	2				+		X								
Trochocarpa gunnii						3	1					+															
Uncinia riparia									+																		
Uncinia tenella						+	2		+			+															
Urtica incisa										1																	
Viola hederacea		+			1	+		1				+					+										
Zieria arborescens		+			+																						

SURVEY
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NOTHOFAGUS CUNNINGHAMII (SOUTHERN BEECH) VEGETATION IN AUSTRALIA

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